

Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

JANUARY, 1958

SPI . . . 55th Year

REACHES industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

SERVES plant managers, superintendents, engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.



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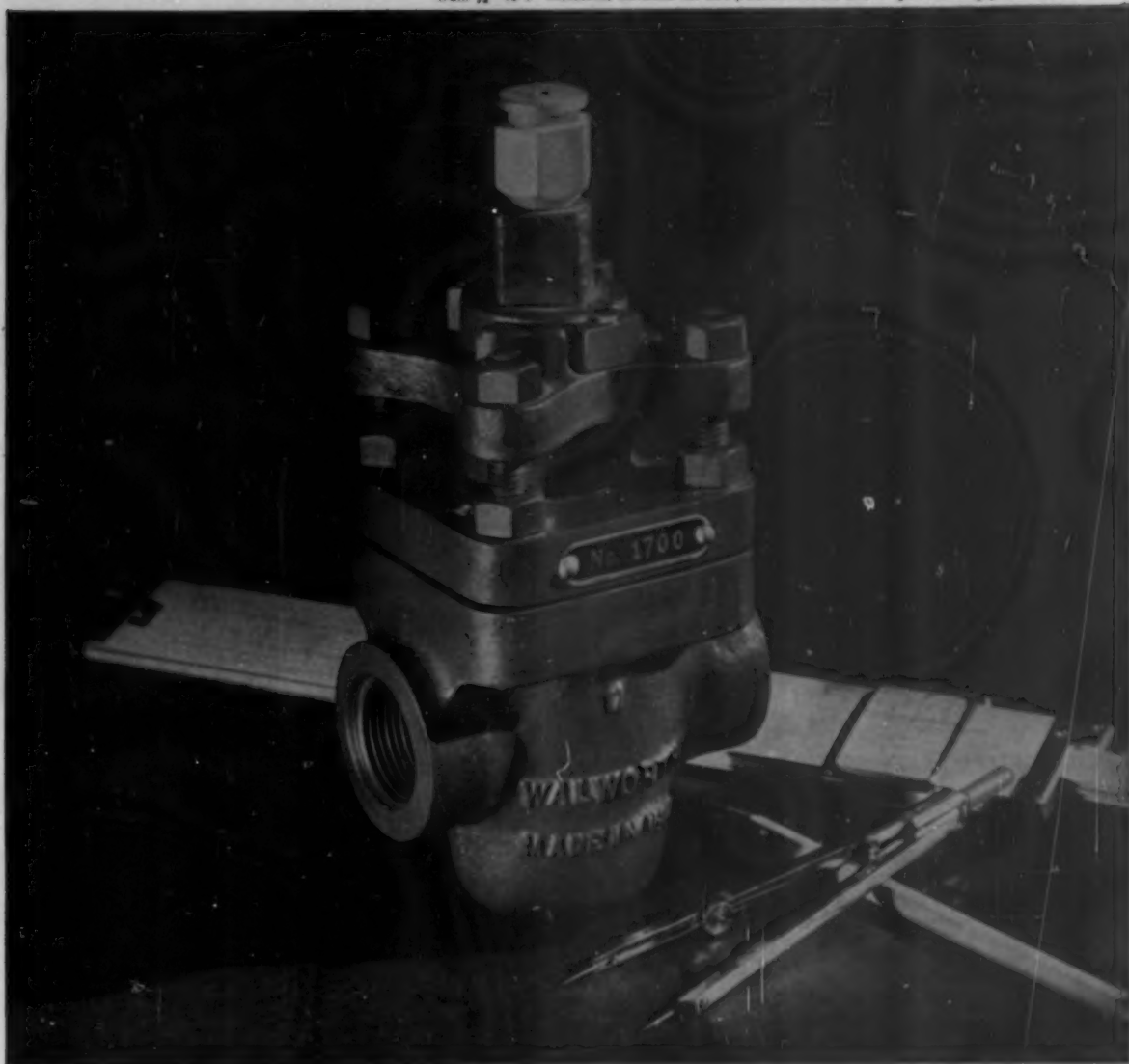
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Volume 76

Number 1

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

Eugene W. O'Brien
Managing Director

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JANUARY, 1958

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Richard L. Priess Associate Editor

Milton C. May Field Editor
P. O. Box 11015, Charlotte, N. C.

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Facts and Trends

January 2, 1958

- ◆ **ELECTRICAL INSTALLATIONS** are not modernized just for the sake of modernization. On pages 36 to 40 J. N. Fogg of Ethyl Corporation's Baton Rouge plant comments on some of the considerations with which they have been confronted during the past several years necessitating a substation modernization program. Mr. Fogg discusses voltage and current, safety hazards, maintenance facilities, costs, flexibility, labor relations aspects, prints and drawings, insurance, fire hazards and expansion requirements.
- ◆ **\$17 MILLION NUCLEAR POWER PLANT** will be built by Carolinas-Virginia Nuclear Power Associates, Inc. at Parr Shoals on the Broad River about 25 miles north of Columbia, S. C. Site is adjacent to South Carolina Electric and Gas Company's Parr Shoals combination hydro-steam electric generating plant. Operating target is 1962. For background data and other atomic energy trends, see page 64.
- ◆ **PURCHASING STANDARDS** can save your company money, Harlan Cross, Purchasing Agent, United States Pipe & Foundry Company of Birmingham, Alabama, stated recently, "an alert purchasing department can assist in spotting symptoms and conditions within a company where the lack of standardization is contributing to confusion, inefficient buying and loss of profit."

The more readily detected ailments are excessive stocks of materials and replacement parts being purchased, slow movement and stagnation of certain stock items, private stocks accumulated by departments, too great a variety and sizes of materials, too great a number of specially designed items being purchased, and lack of uniformity in terminology used to describe the items.

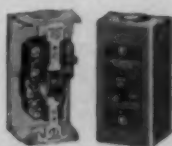
When conditions such as these arise, Mr. Cross emphasizes that it is time to examine the situation to see what parts, purchasing steps, or materials can be eliminated.

- ◆ **MEMPHIS POWER PLANT** — Principal equipment has been selected for the Thomas H. Allen Generating Station being constructed for the City of Memphis, Tennessee. Plant will be of modern compact design, consisting of three units with a total rating of 750,000 kw. It will cost approximately \$121 million and the first unit is expected to begin operation late in 1958. Principal equipment is tabulated on page 41.
- ◆ **INDUSTRIAL EXPANSION BRIEFS** — Western Electric breaking ground for \$20 million telephone-electronics plant near Lee's Summit, Missouri . . . mid-summer operation scheduled for C. P. Clare & Co.'s \$1 million multiple contact relay manufacturing plant at Fairview, N. C. . . . \$100 million Cuban American Nickel Company refinery near New Orleans will make Louisiana largest nickel-cobalt producing state . . . Reichhold Chemicals will build its fourteenth U. S. plant at Hampton, S. C. . . . actual construction is scheduled for Alabama Metallurgical Corporation primary magnesium plant at Selma, Alabama for early January (for more details see pages 12, 16 and 22).

(Continued on page 8)

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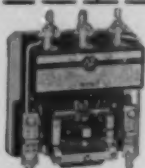
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Bulletin 600 Starting Switch with reliable overload breaker. Rated 1 hp and below.



Bulletin 609, 3 Manual Starter. Max. ratings: 5 hp, 220 v; 7 1/2 hp, 440-550 v.



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Bulletin 715 Size 1 Two Speed Consequent Pole Starter.



Bulletin 705 Size 2 Reversing Starter. Max. ratings: 15 hp, 220 v; 25 hp, 440-550 v.



Bulletin 646 Manual Auto-transformer Starter.



Bulletin 802T Oillight Limit Switch.



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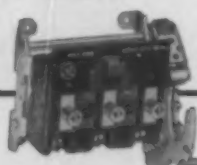
Bulletin 849 "On-Delay" Pneumatic Timer.



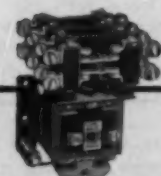
Bulletin 808 Zero Speed Switch.



Bulletin 704 Mechanically Held Relay. Noiseless.



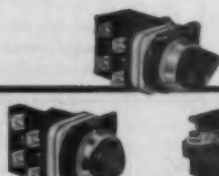
Bulletin 894 Visible Contact Disconnect Switch.



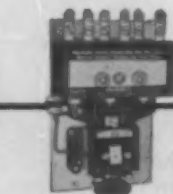
Bulletin 700 Universal Relay with N.O.—N.C. Contacts.



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Bulletin 800T Oillight Push Button, Selector Switch, "Press-to-Test" Pilot Light, and assembled Oillight Station.



Bulletin 702 Three Pole, Size 3 Contactor—100 amperes.

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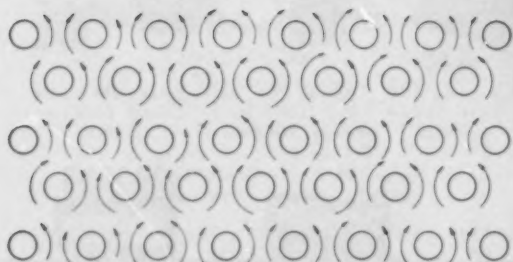
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Photo above shows a shipment of four Keeler Type CPM steam generators leaving the factory for quick hook-up in a railroad shop installation.

KEELER CPM tube spacing provides full heat transfer



KEELER Type CPM

A modification of the CP for gaseous and liquid fuels use. An economical forced draft, pressurized furnace unit complete with burning equipment and accessories attached. Pressures to 500 psi, steam capacities to 34,000-lbs. per hour.

The KEELER CPM STEAM GENERATOR is a modification of the popular CP Boiler in the package field, developed with a pressurized furnace for forced draft operations.

Typical of this package steam generator's features is the "staggered tube spacing" illustrated above, with water tubes positioned at right angles to the gas flow. Full heat transfer is assured with this arrangement—the gases or products of combustion

completely envelope the tubes as they travel from furnace to outlet. Wide and narrow spacing in the tube bank is another CPM feature—permitting quick replacement of any tube, when necessary, without disturbing any other tube.

The KEELER CPM is an economical package steam generator, completely steel encased and insulated, with water cooled furnace. Write for illustrated bulletin containing full specifications.

**YESTERDAY, TODAY, TOMORROW . . . KEELER BOILER EFFICIENCY AND
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The Seal of Quality in Water Tube Boilers

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E. KEELER COMPANY

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KELLOGG'S **ERECTION** **TECHNIQUES** **KEEP PACE**

K-WELD* is one of M. W. Kellogg's many advanced shop fabrication techniques which have been adapted by the company's construction department for field erection of critical power piping. A patented inert gas-shielded method of arc welding which eliminates backing rings and oxidation, K-Weld provides in field erection a smooth internal wall contour equal to that obtained under controlled shop conditions. For "average" as well as super-critical operating conditions, wherever the ultimate in welding is required, more and more power generating companies are turning to K-Weld.

A typical example is found currently in a 137,500 KW unit for a

large eastern utility plant. Here, Kellogg is erecting the critical piping for the latest unit. Reheat piping, being K-Welded above, is 2 1/4% chrome-1% molybdenum alloy, 24.8750" OD, 1.1875" wall thickness. Main steam line is 10.906" ID, 2.410" minimum wall thickness, and 7.906" ID, 1.792" minimum wall thickness, and will operate at 1,940 psi, 1,000 F throttle temperature. For maximum performance, K-Weld is being used on both the main steam line and hot reheat line.

M. W. Kellogg welcomes inquiries on its complete service to the power piping industry from consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.

FABRICATED PRODUCTS DIVISION

THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17, N. Y.

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Kellogg keeps pace in theory as well as practice. This 400-page book is the most comprehensive work ever made available publicly on the design of power piping. This volume, now in its 2nd Edition, is published by John Wiley & Sons, Inc., New York.



POWER PIPING—THE VITAL LINK

*Trademark of The M. W. Kellogg Company

SOUTHERN POWER & INDUSTRY for JANUARY, 1958

For more information, use Reply Card—Page 73

7

Facts and Trends (Continued)

- ◆ SAVANNAH ELECTRIC'S Port Wentworth Power Station is described on pages 48 to 51. Up to the time the unit was engineered, only seven reheat turbine generators of less than 75,000 kw rating had been built. Of these units the smallest have name plate ratings of 50,000 kw.

The 40,000 kw turbine for the Port Wentworth Station will be the first modern day reheat unit to be installed in so small a capacity. It will be installed for steam conditions of 1450 psi, 1000 F, 1000 F reheat. Specifications call for coal burning facilities — an innovation since coal has not been generally used as industrial fuel in the Savannah area.

- ◆ PROPER DELEGATION OF WORK to your associates is the most effective way for you to gain a promotion. Only by such delegation do you train your associates so that you are available for promotion to another job when the opportunity presents itself.

Job rotation is suggested by Lockheed Aircraft's Georgia Division manager, as a good means of developing men for higher jobs. Mr. Kotchian recently commented: "Under a carefully supervised program of job rotation, the man put into a new job starts off on a platform from which the inherent spirit of competition urges him to do a better job than did the man he succeeded. The same spirit of competition affects the other man in his new job. The result is: Both jobs are done better."

- ◆ ULTRASONIC MEASUREMENTS — Trends, equipment and applications are briefed on pages 42 to 47. Electronic measurements for measuring metal wall thickness from one side have been developed and perfected to a point where they are now in extensive use. Consequently, the cost of inspecting steel pipe, pressure vessels, chemical containers, etc., has been greatly reduced.

Industrial and process plants can either purchase instruments and train personnel in their use, or the services of an organization specializing in this type of work may be obtained. Your choice depends on the frequency and number of readings desired.

- ◆ CLEAN AIR, together with humidity and temperature control, is extremely important for satisfactory economical performance of sensitive automatic controls. Consequently, automation as it continues to grow in industry will bring new demands and new requirements for complete air conditioning.

Perhaps no company is more skilled in applying controls than Southern Bell. Therefore, what they do today indicates what general industry will be doing tomorrow as automation becomes more general. Look for SPI's February issue to see how correct automation environment is provided by experts.

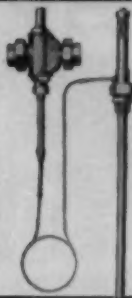
- ◆ TUBULAR STEEL supports transmission line now being constructed by Georgia Power Company. The 36 mile, 230,000 volt line will originate at Plant Yates, near Newnan, Georgia and terminate at Morrow. Construction cost is about \$37,000 per mile.

Transmission lines of 230,000 volts must be set at a far greater height than lines carrying a lower voltage. Difficulty of obtaining wooden poles sufficiently long figured largely in the decision to use tubular steel. Engineers also point out that pole replacement costs will be lessened over the years.

- ◆ FOUR FUEL PLANT — The Yorktown Power Station of Virginia Electric & Power Company will be described in SPI for February. It burns a combination of coal, delayed coke and gas. It is also equipped to burn Bunker-C fuel oil. Delayed coke is a by-product of the petroleum refinery.

Low-cost Temperature Control — by SARCO

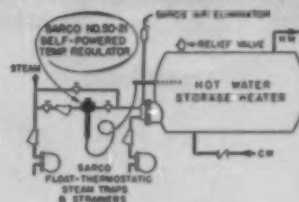
Self-Powered and Electric Indicating



Sarco Temperature Controllers Self-Powered . . . Fully Modulating

Simple as ABC . . . a thermostat with capillary tubing and a valve. That's all! Operated by liquid expansion. Automatic. Self-powered . . . no electricity or compressed air required. Self-contained . . . no exposed mechanism. Packless valve . . . no stuffing box to leak or stick. Easy to install by any pipefitter.

Furnished with thermostats suitable for any liquid or for air in dryers, ovens, air ducts, etc. Valve sizes . . . 1/2 to 6". Temperature ranges to 300°F. Bulletin 620-2.



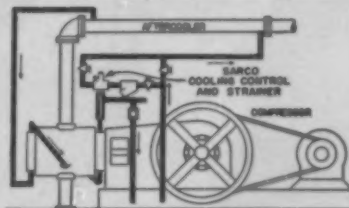
Typical applications: Shell and tube heat exchangers; condensers, oil storage tanks, dryers, etc.



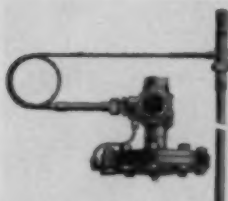
Sarco Cooling Controls Self-Powered . . . Fully Modulating

Simple, compact, automatic thermostatic valve. Eliminates overcooling and undercooling. Saves water. Overall height of 3/4" size is only 17 1/2". Self-powered . . . requires no electrical or compressed air hook-up. Valve and bulb all in one unit. No exposed mechanism. Single-seated packless valve . . . not affected by silt or scale-forming minerals.

Valve sizes . . . 1/4 to 1 1/2". Temperature ranges between 40° and 210°F. Bulletin No. 710-B.



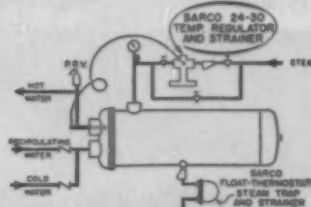
Typical applications: compressors, small engines, water-cooled bearings, condensers, dry cleaning stills, etc.



Sarco Temperature Controllers Self-Powered . . . Single-Seated, Tight-Closing

A simple, self-powered automatic temperature controller with diaphragm-operated, pilot-controlled valve. Designed for intermittent service or service involving long periods with practically no call for steam. Self-powered by liquid expansion . . . no electricity or compressed air needed. Packless.

Valve sizes . . . 1/4 to 3". Temperature ranges to 300°F. Bulletin No. 625-B.



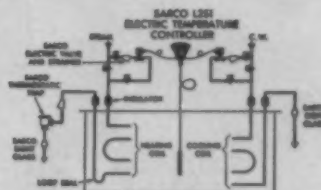
Typical applications: instantaneous heaters, fuel oil pre-heaters, high pressure applications on hot water storage tanks.



Sarco Electric Temperature Controllers Indicating Type

Simple, inexpensive, electric-indicating automatic temperature controller. Sensitive enough to perform many of the functions of much more elaborate recorder-controllers, at a fraction of their cost. Responds to changes of $\pm 1/2^\circ\text{F}$. Adjustable. Large, easy-to-read scale shows both actual and set temperatures.

Temperature ranges between minus 90° and plus 650°F. Offers many sequence combinations such as step-heating. Bulletin 1025-B.



Typical applications: plating tanks, processing vats, kettles, chemical tanks, etc.



Sarco Stat Hydraulic Motor Valves Electrically Operated

For remote control by hand or thermostat. Open and shut operation. Can be equipped with semi-modulating mechanism. Powerful hydraulic action operates valves up to 5" single-seated, or 8" double-seated, at pressures up to 175 psi. Ruggedly constructed . . . to withstand severe use without constant supervision and with minimum maintenance. Operates in any position.

For direct connection to 110 volts A. C., 60 cycle current. Valve sizes . . . 1/2 to 5" single-seated; 1/2 to 6" double-seated. Bulletin 1080-A.

UNDIVIDED RESPONSIBILITY

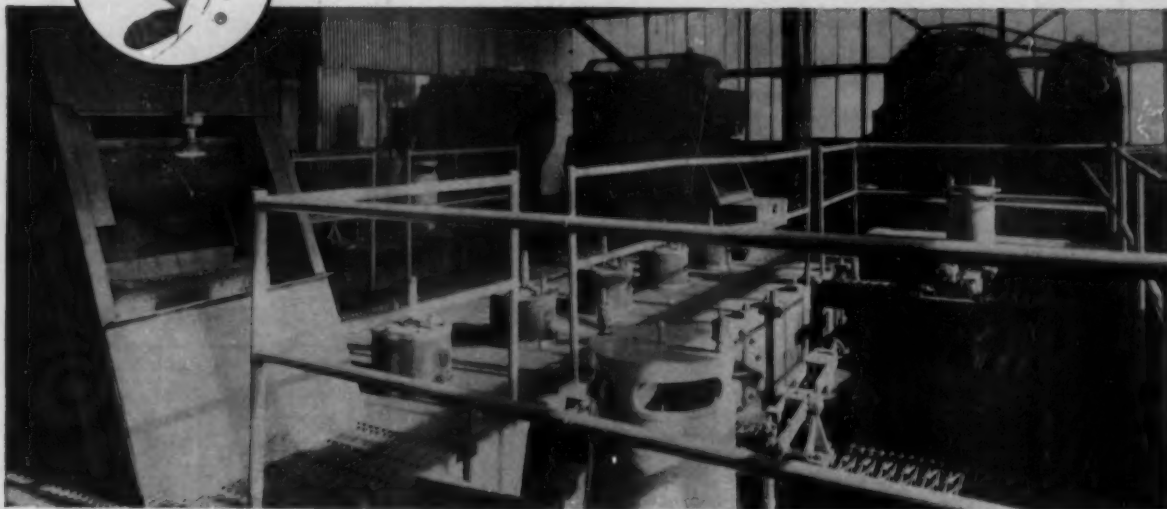
From one "Complete Line" source . . . SARCO-SARCOTHERM . . . for temperature controllers, steam traps and other heating specialties.

2230-B

Write for Bulletins to — Sarco Co., Inc., 635 Madison Ave., New York 22, N. Y.



WHY CHESSIE'S RAILWAY IS FIRST IN COAL



SUPERIOR COAL. The entire output of this mine is processed by automatic compound coal cleaning equipment. Producers on the Chesapeake and Ohio are prepared to supply you with highest quality coal of the type best suited to your needs and processed to your own specifications.

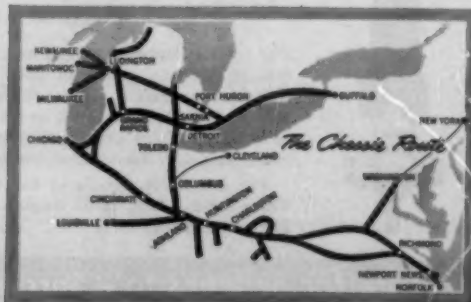


SUPERIOR SERVICE. With the world's largest fleet of coal cars, kept in better than 99% good order, Chesapeake & Ohio trains roll at top speed over a roadway specially designed and maintained for heavy coal haulage.

For dependable deliveries of top quality coals, contact coal producers on the C & O. And for specific help in meeting your own fuel requirements, write to: R. C. Riedinger, General Coal Traffic Manager, Chesapeake and Ohio Railway Co., Terminal Tower, Cleveland 1, Ohio.

Chesapeake and Ohio Railway

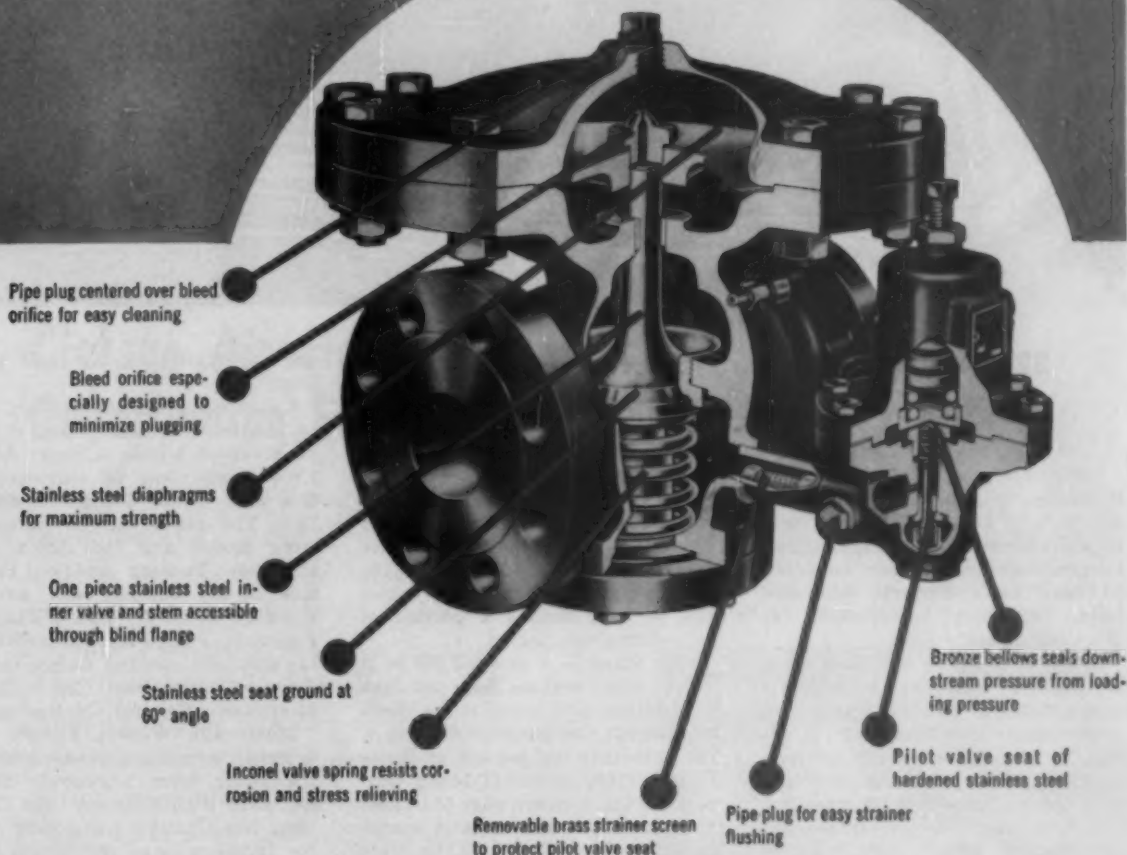
WORLD'S LARGEST CARRIER OF BITUMINOUS COAL



THE FISHER® 92B

IMPROVED

TO MINIMIZE PROBLEMS INHERENT IN STEAM SERVICE



Not content with the enviable performance record of the Type 92A, Fisher engineers have improved this pilot operated pressure reducing valve to a new peak of performance.

For extremely accurate, long trouble-free service, put a Fisher 92B in the line. One pilot with three interchangeable springs provides a range of from 2 to 150 psi. • Send for Bulletin D-92 today.



Engineers with special problems... find the answer in...

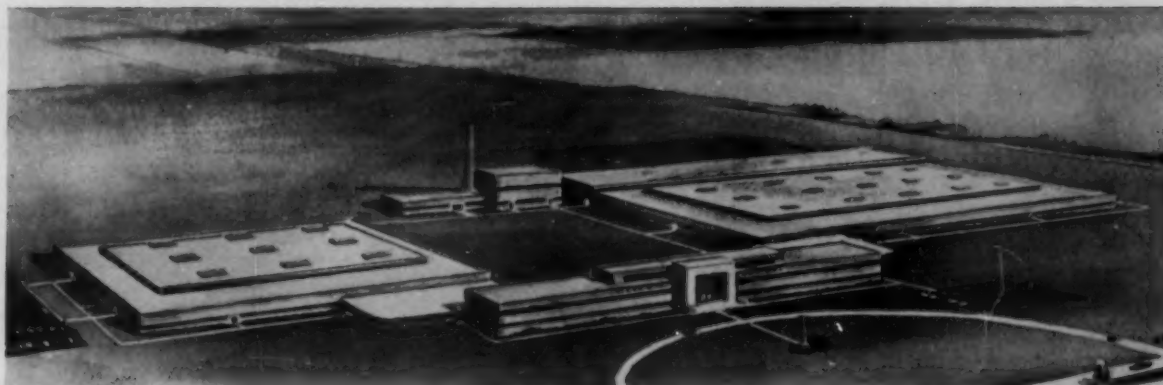
FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario





Southern News Briefs



\$20 Million Telephone-Electronics Plant Started by Western Electric - Missouri

Early this year, **Western Electric Company**, manufacturing and supply unit of the Bell System, will break ground for a new \$20 million telephone-electronics plant on Route 50 near **Lee's Summit, Missouri**. Initial occupancy is scheduled for late 1960 or early 1961.

About 1,300,000 sq ft of floor space is planned including a two-floor administration building, and two single-story manufacturing buildings — one for telephone set production and the other for electronic components (transistors, thermistors, varistors plus vacuum tubes and switchboard lamps). Some 3,500 to 4,000 will eventually be employed with a total payroll of around \$15 million.

Industrial waste will be handled

through Lee's Summit sewage facilities while the Missouri Water Company will arrange, through Lee's Summit, to supply the plant's water needs before the buildings reach the operating stage. Kansas City water will be used during a portion of the construction period.

Pilot Plant — A new 232,000 sq ft "pilot" plant will be built by Jack D. Merriman and leased to the Western Electric Company for five years. This plant, to be located at Route 71 and 119th Street (Truman Corners) on the northern edge of Grandview, will be used to start manufacturing operations and to train personnel for Western Electric's permanent plant on Route 50. The manager and key personnel for this plant will be announced before

operations start in the pilot location.

Construction of this building will be started immediately and it will be occupied within a year. About 1,000 people will be employed in this stage of the Company's operation. The plant will be of single story design and face brick construction. Parking lots on either side of the building will provide space for about 475 cars. William B. Fullerton, Jr. and associates of Kansas City, Mo., are the architects and Estrin Construction Co. will be Merriman's General Contractor.

Meanwhile, Western Electric will establish temporary headquarters in the Jones Store warehouse building, 2312 West Pennway. The Company has obtained a one year lease for 16,500 sq ft on the second floor of the warehouse building where it will open an employment office and conduct toolmaking and apprentice training.

Electronics Plant for Fairview, N. C.

With occupancy scheduled for mid-summer, construction is underway on **C. P. Clare & Co.'s Fairview, North Carolina** 40,000 sq ft manufacturing plant. C. P. Clare & Co., with headquarters in Chi-

cago, manufactures multiple contact relays for electrical, electronic and industrial use.

New factory is being erected by the Merchant Construction Co. on Clare property on U. S. 74. Total expenditure will be approximately \$1,250,000. The Six Associates, Asheville architects and engineers, de-

signed the plant and are supervising construction.

D. G. Callahan is general manager of the C. P. Clare & Co. electronics plant at Fairview and **James A. White** is personnel director. The company has operated for the past year in temporary Fairview, N. C. quarters.



Architect-Engineer
George L. Dahl Architects and Engineers
Dallas, Texas

General Contractor
R. P. Farnsworth & Co., Inc.
New Orleans, La.

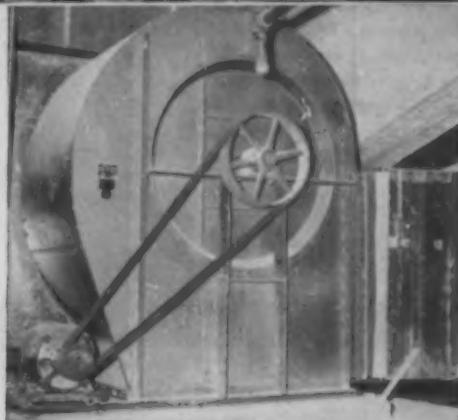
Plumbing, Heating, Air Conditioning
C. Wallace Plumbing Co., Inc.
Dallas, Texas

Another Coliseum Chooses Clarage Air Handling and Conditioning Equipment

IMPRESSIVE in the Texas tradition is the new Dallas Memorial Auditorium. Its circular arena building, reportedly the largest cement domed structure in the nation, connects with a convention building and lyceum, shown on the right above.

Air handling throughout this vastness was assigned to Clarage equipment—Multitherm conditioning units, Unicoil sprayed coil units, giant system fans, ventilating sets.

Here again, as in New York's new Coliseum and other prominent buildings of all types, Clarage equipment was chosen for its recognized ability to perform quietly, economically, and dependably. CLARAGE FAN COMPANY, Kalamazoo, Mich.



One of several Clarage Type NH fans located in the outer ring which encircles the Coliseum's dome.



Arrangement of air conditioning ductwork, viewed before completion of the ceiling.

CLARAGE

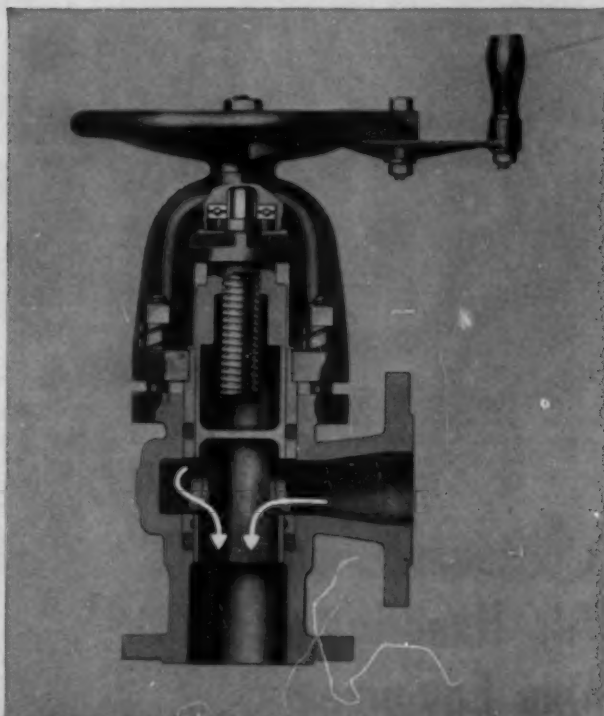
...dependable equipment for
making air your servant

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

These YARWAY VALVE DESIGNS

YARWAY SEATLESS

Features balanced nitralloy hollow plunger that seals line drop-tight, yet permits free, unobstructed flow in blow-down. Other features —laminated packing, alemite lubrication, ball thrust bearings. USED SUCCESSFULLY IN OVER 15,000 BOILER PLANTS.



**FOR
LOW and
MEDIUM
PRESSURES**

YARWAY HARD-SEAT

Features tough, stellite-faced and ground disc and seat ring, mated to provide smooth long-wearing surfaces. Stream-line flow. Alemite lubrication. MORE THAN 4 OUT OF 5 HIGH PRESSURE BOILER PLANTS USE YARWAY BLOW-OFF VALVES.



**FOR
HIGHER
PRESSURES**

USED IN OVER 15,000 BOILER PLANTS

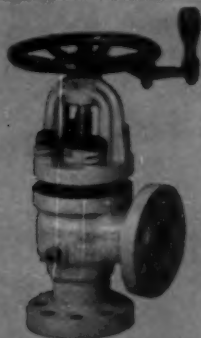
serve every boiler blow-down need

■ Whatever your *pressure* requirement, whatever your *pipng* requirement—there's a Yarway Blow-Off Valve to exactly meet your needs.

Popular Yarway *seatless* design keeps blow-down lines drop-tight in low and medium pressure ranges. Sturdy Yarway *stellite seat and disc* design protects higher pressures.

All Yarway Blow-Off Valves are strong, rugged valves, built to withstand the punishment of regular or emergency blowing-down under full boiler pressure, and are available in metals that stand up under acid washing of boilers.

Write for new Yarway Blow-Off Valve Bulletins—B-426 (pressures to 400 psi) or B-434 (pressures to 2500 psi).



• Yarway Type B Seatless Blow-Off Valve, iron body for boiler pressures to 200 psi, steel bodies, for pressures to 400 psi. Angle valve shown, straightway available. Flanged connections. See Bulletin B-426.



• Yarway Type B Seatless Tandem Blow-Off Valve combining two angle valves. Other combinations available. Iron bodies for boiler pressures to 200 psi, steel bodies for pressures to 400 psi. See Bulletin B-426.

• Yarway Type C Seatless Tandem Blow-Off Valve combining angle and straightway valves. Other combinations available. Flanged or welding connections available. For boiler pressures to 600 psi. NOTE: When used in tandem with a Yarway Hard-Seat Valve, Type C Seatless may be used to 1500 psi. See Bulletin B-434.



• Yarway Hard-Seat Blow-Off Valve, for pressures to 2500 psi. Straightway valve shown. Angle available. Welded (shown) or flanged connections. See Bulletin B-434.



• Yarway Hard-Seat-Seatless Hybrid Tandem Blow-Off Valve. Hard-Seat in the blowdown valve, seatless in the drafting valve. Available in any combination of connections. For pressures to 1500 psi. Hard-Seat-Seatless and seatless for pressures to 2500 psi. See Bulletin B-434.



• Yarway Hard-Seat Tandem Blow-Off Valve. Hard-Seat in blowdown valve, seatless in drafting valve. Available in any combination of connections. For pressures to 1500 psi. Hard-Seat-Seatless and seatless for pressures to 2500 psi. See Bulletin B-434.

LET YARWAY HELP SOLVE YOUR
BOILER BLOW-DOWN PROBLEMS!

YARNALL-WARING COMPANY

Home Office:

116 Mermaid Avenue, Philadelphia 18, Pa.

Southern Representative:

ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY

**blow-off
valves**



Kaiser Aluminum Expands Electrical Conductor Div.

The appointments of **Clarence W. Higbee** as assistant general manager and **Gillette N. Houck** as sales manager of the newly established Electrical Conductor Division, **Kaiser Aluminum & Chemical Corporation**, have been announced by **J. T. Dugall**, general manager of the division.

Establishment of the Electrical Conductor Division is part of the company's recently announced move to divide its aluminum operations into five major divisions, each with responsibilities for both the production and sale of its products.

Mr. Higbee, a veteran of nearly 40 years in the electrical conductor industry, joined the company earlier this year when Kaiser Aluminum purchased the wire and cable business of the United States Rubber Company.

As sales manager for the division, **Mr. Houck** will be in charge of Kaiser Aluminum's nationwide sales program for electrical conductor products, serving electric utilities, industrial accounts, electrical wholesalers and

original equipment manufacturers. **Assistant General Manager CLARENCE HIGBEE**, Sales Manager **GILLETTE HOUCK**, Southeastern Regional Manager **W. J. LAWRENCE**, and South Central Regional Manager **E. K. MATTESON**.

original equipment manufacturers.

Mr. Houck joined Kaiser Aluminum in 1947 and has held a variety of sales and executive sales positions in Kansas City, Missouri; Newark, Ohio; and Chicago, Illinois, including his most recent post as product manager, electrical conductor products.

The newly appointed regional managers for electrical conductor sales include:

W. J. Lawrence — Southeastern region comprising the Philadelphia, Atlanta and Miami districts. Mr. Lawrence has been functioning as branch manager at Birmingham, Alabama. He joined the company in 1951 as a sales trainee and later gained electrical conductor sales experience in Florida, Alabama and Tennessee.

E. K. Matteson — the South Central region headquartered at Kansas City, Dallas and St. Louis. Mr. Matteson has been with Kaiser Aluminum since 1952 as a service engineer for electrical conductor products within the Chicago metropolitan area.

\$100 Million Refinery to Make Louisiana Largest Nickel-Cobalt Producing State

One of the world's largest production centers for nickel and cobalt is now being established at **Port Nickel**, 10 miles southeast of New Orleans. A Freeport Sulphur Company subsidiary, **Cuban American Nickel Company**, has completed financial arrangements for the \$100 million project which will refine ore concentrates from Cuba.

Scheduled capacity will be 50,000 lb per year of nickel and 4,400,000 lb of cobalt with production scheduled for the middle of 1959. The Cuban-American project not only will increase by about 20% the 1956 United States supply of primary nickel but will represent the first substantial domestic output of this essential metal. The great bulk of

the nation's current of nickel is imported from Canada.

The nickel and cobalt ores will be mined in Cuba from deposits on Cuba's northeast coast. After initial processing, the resulting concentrates will be shipped to Louisiana for refining. The vessel on its return trip will carry liquid sulphur from Port Sulphur for use in the Cuban operations.

Freeport, second largest sulphur producer in the country, currently operates four sulphur mines in Louisiana. It also has oil and gas interests in Louisiana and neighboring states, and is a joint owner of National Potash Company, which produces potash near Carlsbad, New Mexico.

Steel Tubing Mill at Sheffield, Ala.

Steel tubing in all commercial sizes and gauges, round, square, rectangular, and odd shapes, is available to manufacturing companies with the opening of a new tube division of **Southern Fabricating Company, Inc.**, Sheffield, Alabama.

First shipments have already gone out from the completely equipped, modern plant, which will have a capacity of millions of feet per month, according to Southern Fab's recently appointed sales manager, **William E. Dally**.

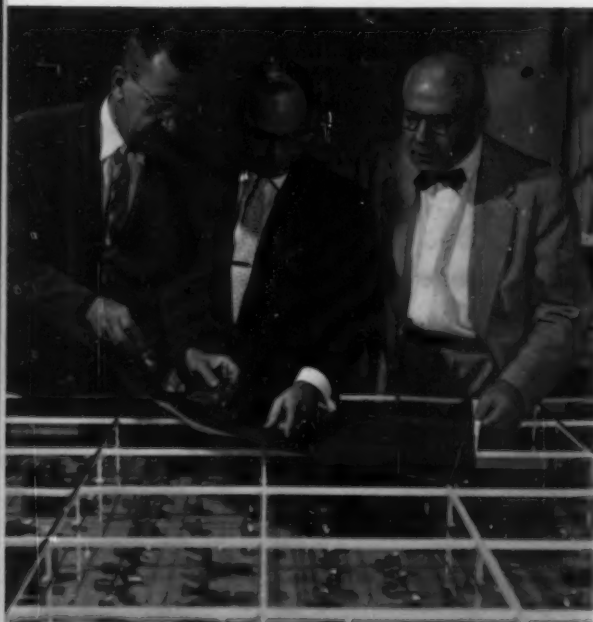
Yoder slitters and tube mills are producing tube from $\frac{1}{8}$ " O.D. to 4" O.D., in a 300,000 sq ft factory area. Hot rolled finish, cold rolled finish, painting and plating grades, and hot-dip galvanized finish are offered.

Meeting
tomorrow's
power
demands



**How General Electric speeds
turbine-generator production**

Advanced machines and techniques improve General Electric's turbine-generator output



Expanded facilities will soon add to the production capacity of the large steam turbine-generator plant. Shown reviewing expansion plans are H. R. Hill, Mgr-Manufacturing, C. A. Lilly, Mgr-Marketing, and W. E. Saupe, Gen'l Mgr.

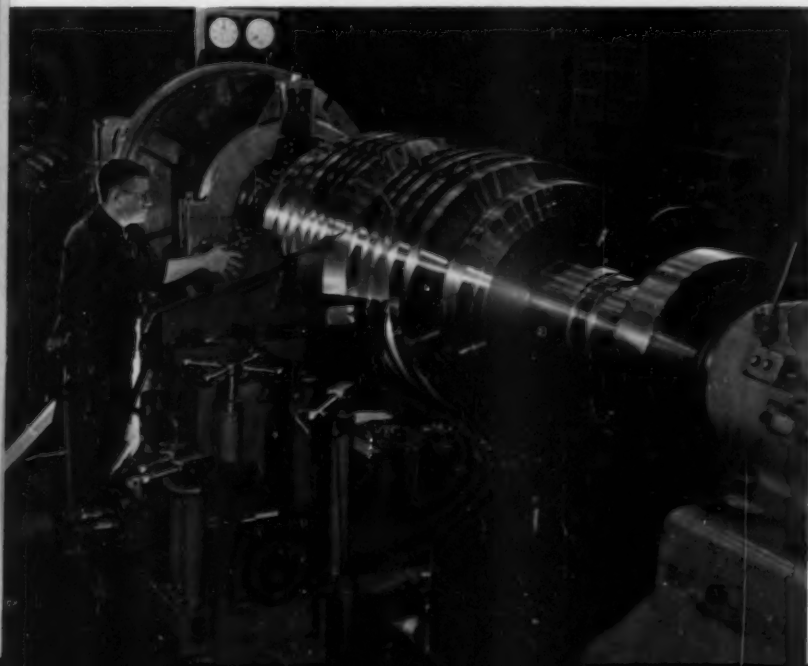
Meeting the requirements of the constantly expanding electric utility industry sets a challenge that is answered by General Electric's continued investment in its large steam turbine-generator manufacturing facilities in Schenectady.

New machine tools — some of them the largest ever made and the only ones of their type — add to the production efficiency required to build precision turbine-generator components, many with tolerances as close as those of a fine watch. Combined with General Electric's organization of skilled craftsmen and turbine-generator engineers, these tools and facilities provide the flexibility needed to keep pace with today's rapid advances in turbine-generator technology. And, in building tomorrow's even more efficient and reliable machines of advanced design, this combination will help maintain a well-established reputation for meeting delivery commitments.

A few of the facilities in the large steam turbine-generator plant that contribute to these outstanding achievements are shown here.

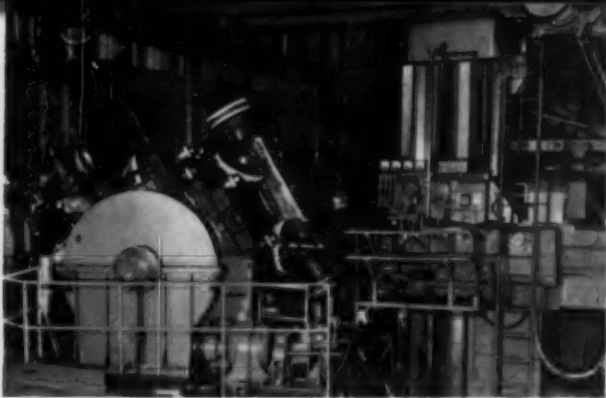
GENERAL  ELECTRIC

Grooving lathe removes metal from this turbine rotor at the rate of 100 cubic inches per minute — can take 25-ft forgings weighing up to 100 tons and is equipped to machine deep grooves up to 2½ inches wide.

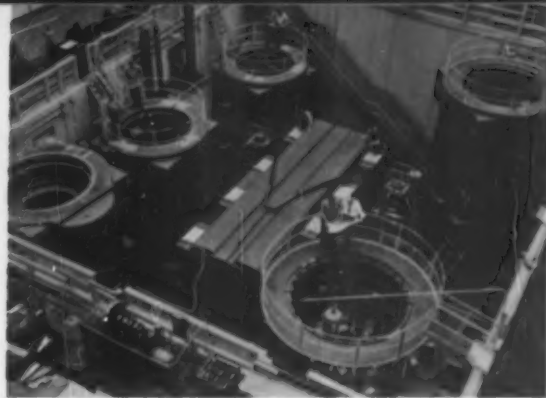


Traveling reamer brings machine to job. Here, unit reams holes in turbine wheel and dovetails of 43-inch buckets.





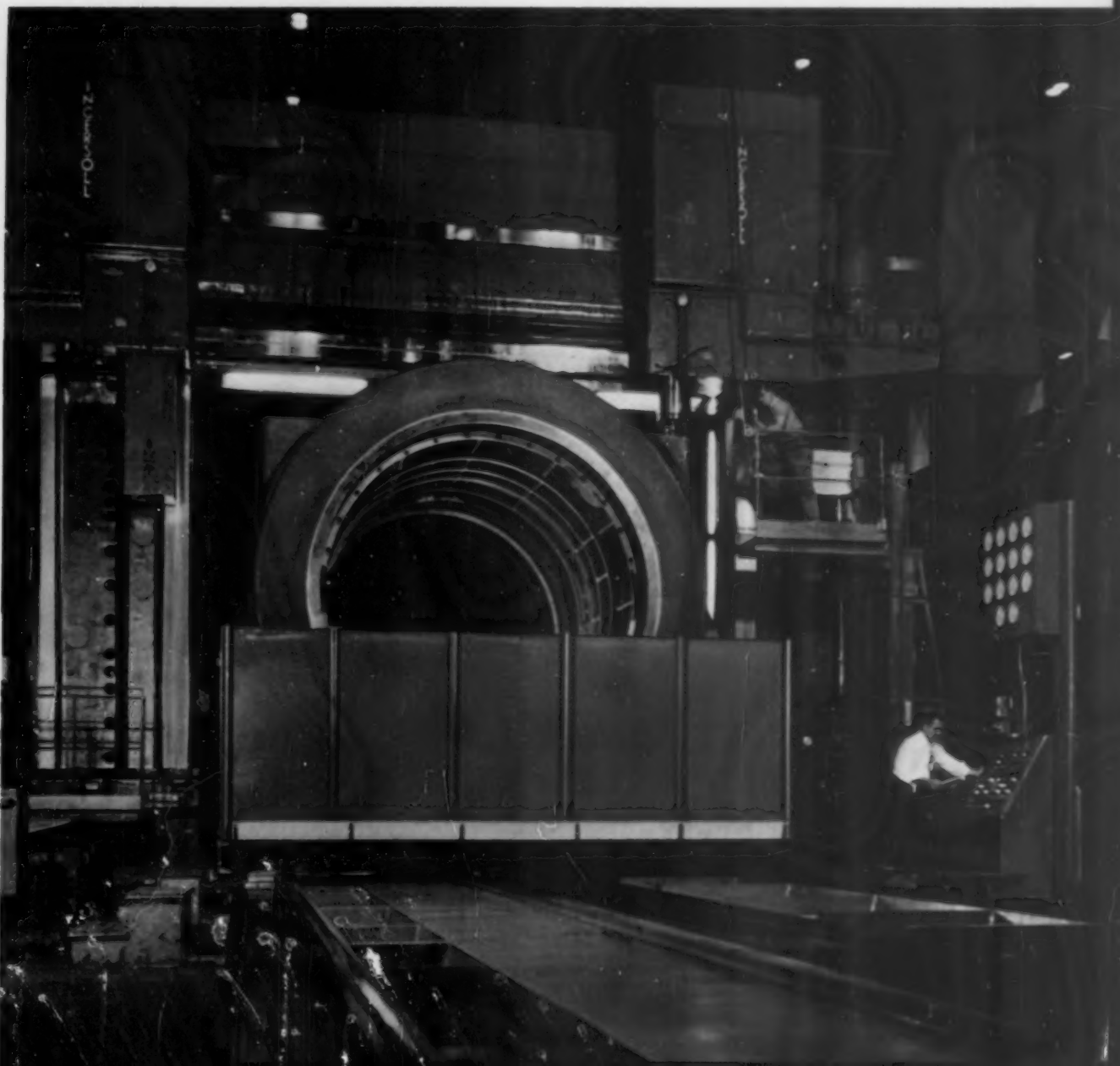
Horizontal boring mill has special fixture for positioning and machining 100-ton turbine shells at complex angles. This unique arrangement considerably reduces set-up time.



30-ft deep stacking pit accommodates six generator stators at the same time for stacking laminations. Each of the six stations has its own hydraulically operated press.

World's largest adjustable rail milling machine, capable of work equivalent to three 18-ft planers, saves time by allowing work to be set up on one table while machining

proceeds on the other. Shown here machining a 225,000-kw generator stator frame, this mammoth unit stands 35-ft high, is 120-ft long and weighs 1,230,000 pounds.



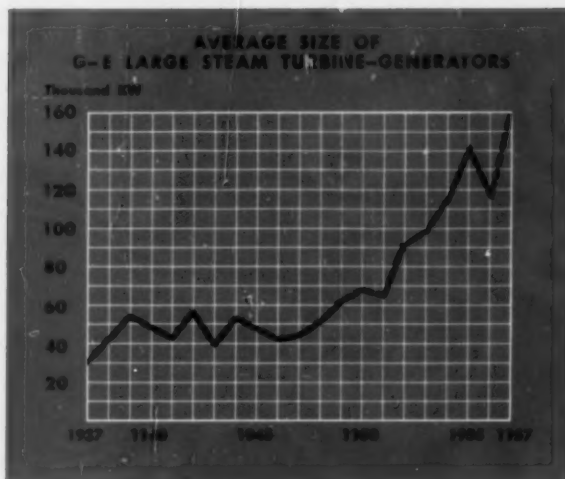


General Electric is helping to meet tomorrow's power demands... today

To keep pace with the tremendous design advances of tomorrow's powermakers, new manufacturing techniques are continually being developed, and additional unique production tools are being designed and built. Already, electronic and magnetic tape controls are being applied to increase speed and improve accuracy of some machining processes.

Such forward-thinking investment in new tools and facilities for building large steam turbine-generators gives assurance that General Electric will continue to help the electric utility industry maintain its spectacular record of meeting the nation's constantly expanding power needs. Large Steam Turbine-Generator Department, Schenectady, New York.

254-54



Larger units, ranging up to 450,000 kw in size, are now being designed and built. Historical growth in average size of powermakers shipped from Schenectady is shown here.

Progress Is Our Most Important Product

GENERAL  ELECTRIC

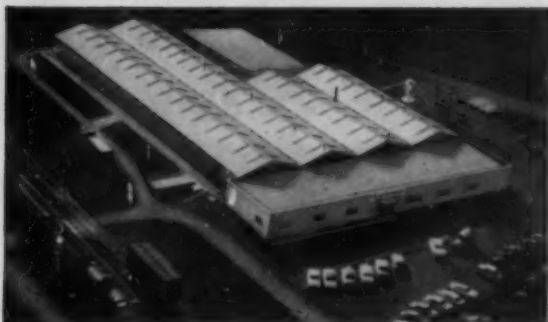


Precision-made parts are assembled on site. Even large buildings go up fast—"move in" time is reduced.



Rigid frame design permits floor-to-ceiling, wall-to-wall use of space. Buildings can be completely insulated.

Why Armco Steel Buildings give you more value for your money



Buildings can easily be enlarged or modified by adding standard units.



Note that the overhead crane has free access to all sections of the building.

Armco Steel Buildings give you more solid value for your building dollar. The reasons: Basic Armco plans save preliminary design and engineering costs. Factory-engineered parts are delivered to your site ready for rapid assembly. Standard panels lock together quickly, then are bolted top and bottom. This modern technique saves many costly steps of conventional construction.

The saving goes into the quality of the building, too.

In an Armco Steel Building you get a weathertight structure that withstands greater wind and snow-loading. The aluminum-coated or zinc-coated steel panels assure extra durability. Maintenance costs are greatly reduced, too.

Attractive, long-lasting steel buildings are available in more than 5000 sizes, from 28 sq. ft. to more than 100,000 sq. ft. with clear spans up to 100 ft. Interiors can be finished just like any other building.

Before you make a decision on your building needs, be sure to get the full story on Armco Steel Buildings.

ARMCO DRAINAGE & METAL PRODUCTS, INC.

DIXIE DIVISION

619 Forsyth Bldg. • Atlanta, Georgia

SOUTHWESTERN DIVISION

C & I Life Bldg. • Houston, Texas
Other Offices in Principal Cities

Send information on Armco Steel Buildings for the following uses:

Approximate size _____

Name _____

Street _____

City _____ Zone _____ State _____

ARMCO STEEL BUILDINGS



Chemical Recovery Unit Completed for Halifax Paper — North Carolina

Ebasco Services Incorporated has announced the completion of a chemical recovery unit for the **Halifax Paper Company of Roanoke Rapids, North Carolina**. Ebasco supervised the engineering and construction of the project in which 21 suppliers participated.

The very latest developments in design and physical equipment have been incorporated to insure maximum operating efficiency and the lowest possible outage time. The plant has a designed capacity of 1,500,000 lb of dry solids per 24 hours. Present day schedules require that paper mill boilers operate without interruption except for scheduled shut-downs.

With an eye towards the possibility of future power generation, a relatively high design pressure of 1,000 lb, operating pressure 850 psig, at 825 F temperature, was selected. Boiler is equipped with superheater, economizer, stainless steel air heater, automatic sequential Diamond soot blowers, tubular

evaporator, black liquor heaters, water cooled smelt spouts and steam atomizing oil torches.

Both F.D. and I.D. fans are motor driven, the latter through a variable speed hydraulic coupling. Black liquor pumps are also supplied with hydraulic couplings, and three feedwater pumps, two motor and one turbine driven, supply treated water to the boiler.

The plant, of semi-outdoor design, conducive to better ventilation and cleanliness, also contains among its many modern facilities a Graver hot lime softening plant and Zeolite softeners (designed for 600 gpm); a three compartment, wet bottom, electrostatic precipitator (designed to handle 210,000 cfm of gas at 300 F); a 15 ton pneumatic handling system; a very complete system of automatic controls; and an alarm and annunciator system.

A specially constructed 300 ft concrete stack, topped with a unique steel nozzle, minimizes the serious problem of air pollution by dis-

charging gases high enough into the atmosphere to allow good diffusion over a wide area.

Reichhold Chemicals Start S. C. Plant

The fourteenth U. S. plant of **Reichhold Chemicals, Inc.**, will be built at **Hampton, South Carolina**, where RCI has just purchased a large tract of land.

The first units to be built will include a large methanol terminal and facilities to produce 30,000,000 lb of formaldehyde annually. Production will be underway about July, 1958.

Ala. Magnesium Plant

All preliminary planning has now been completed for **Alabama Metallurgical Corporation's** primary magnesium plant at **Selma, Alabama**. A railroad spur has been built on the property to the plant site and actual construction is scheduled for early January. Initial production is probable by mid-summer and full production by the fall of 1958.

Georgia "Plus-Million" Testing Machine Largest in Southeast

Capable of applying tension or compression loads up to 1,200,000 lb, a new Baldwin-Lima-Hamilton universal testing machine is now in operation at the Georgia Division of the **Lockheed Aircraft Corporation**, Marietta, Georgia.

Although primary utilization will be for aircraft structural members and components, it will be available on a commercial basis to government and private concerns requiring tests in the plus-million pound range.

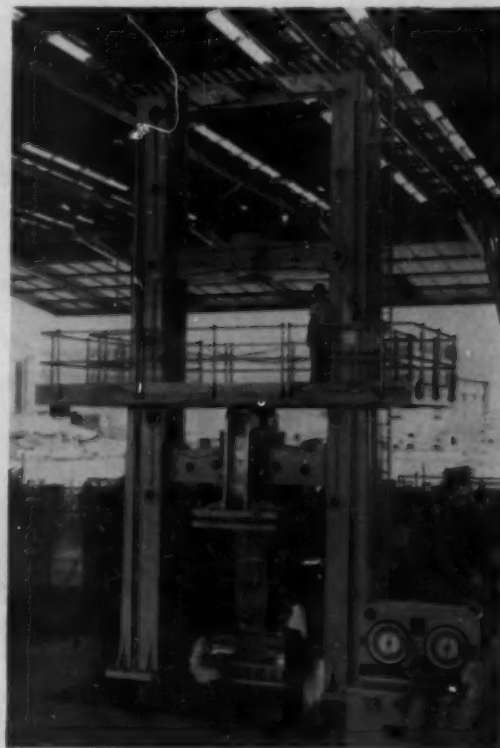
Photo shows how the 90-ton test machine performs compression tests on a 12 ft C-130 Hercules wing panel. Such components can be pushed in compression, pulled in tension, bent in flexure or loaded in many ways to simulate service conditions.

A Heele-Shaw radial piston hydraulic pump driven by a 10 hp electric motor supplies hydraulic fluid at 3,000 psi pressure to the main cylinder of the machine. This pulls the loading head down, exerting a tremendous force through a power stroke of 36 in. at a maximum rate of 2.5 in. per minute.

A Tate-Emery capsule weighs the loads applied which are read on two dial indicators mounted on a control console. Six load ranges from 24,000 to 1,200,000 pounds are provided with an accuracy of plus or minus .5 percent on each scale.

Built at a cost of \$175,000 by the Baldwin-Lima-Hamilton Corporation of Eddystone, Pa., the universal testing machine was erected by Capitol Construction Company of Atlanta.

Prior to installation, Capitol removed 1,000 cu yds of earth, erected 8.5 tons of steel and poured 200 cu yds

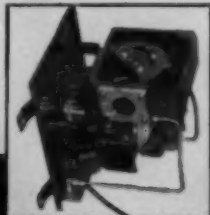


of concrete to build an underground foundation 26 ft wide, 30 ft long and 16 ft deep. Walls vary in thickness from 24 to 48 in.

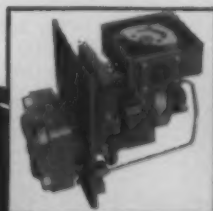
REPUBLIC'S new family of NULL-BALANCE-VECTOR* PNEUMATIC INSTRUMENTS



TYPE VC
Control Transmitters



TYPE VT
Temperature Transmitters
Standard Range
0-100° to 0-1000 F.



TYPE VDP
Differential Transmitter
Standard Range
0-15 to 0-300" H₂O



TYPE VP
Pressure Transmitter
Standard Ranges
0-1.5" to 0-5000 psi

* Design principle which permits making extremely accurate and sensitive components that are compact, versatile and interchangeable.

Republic's new line of pneumatic instruments includes pressure, differential pressure, temperature and control transmitters. Controllers that feature repeatable reset rate, less than 0.05% dead band and proportional band adjustment from 2 to 500%;—differential pressure transmitters with 20 to 1 range adjustment;—pressure transmitters of $\pm 0.5\%$ accuracy; and temperature transmitters with 10 to 1 range adjustment show the flexibility as well as the compactness, lightweight and accessibility of these instruments.

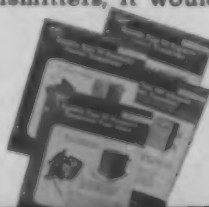
THE NULL-BALANCE-VECTOR PRINCIPLE

In terms of calibration, the null-balance-vector principle means that the span of any pneumatic instrument in the line can be varied at will . . . merely use a screwdriver and a reference . . . without re-setting zero. In terms of theory, the null-balance-vector principle means that the

proportion of an input force (from a measuring bellows, bourdon tube, diaphragm, etc.) balanced by the pneumatic circuit can be varied by changing the angle at which that force acts on other links in the system. Hence, without changing air supply pressure or the measuring bellows, bourdon tube or diaphragm, the same output signal pressure range can reflect a measured input signal range that can be changed as much as 20-to-1.

Republic's new family of pneumatic instruments was developed in parallel programs that use the greatest possible number of common components. The result: High interchangeability of parts, even between instruments performing entirely different functions. Such design foresight has made the spare parts and training problems extremely simple. And Republic's null-balance-vector design means that full-range operation involves virtually no motion . . . and virtually no wear.

If you want the best sensitivity, accuracy and reliability in pneumatic transmitters, it would pay you to get full details on all four of Republic's new family of Null-Balance-Vector Pneumatic Instruments. Write for descriptive folios on each type, now.



REPUBLIC FLOW METERS CO.

A Subsidiary of Rockwell Manufacturing Company
2240 Diversey Parkway • Chicago 47, Illinois



One of two Plants at Canajoharie, N. Y.

BEECH-NUT LIFE SAVERS, INC.

LIKE **Frick Refrigeration**

And use ten big Frick ammonia compressors, plus numerous condensers and coolers, in their famous plants at Canajoharie, N. Y.

For process work, air conditioning, and cold storage, Beech-Nut Life Savers find Frick Refrigeration an indispensable aid.

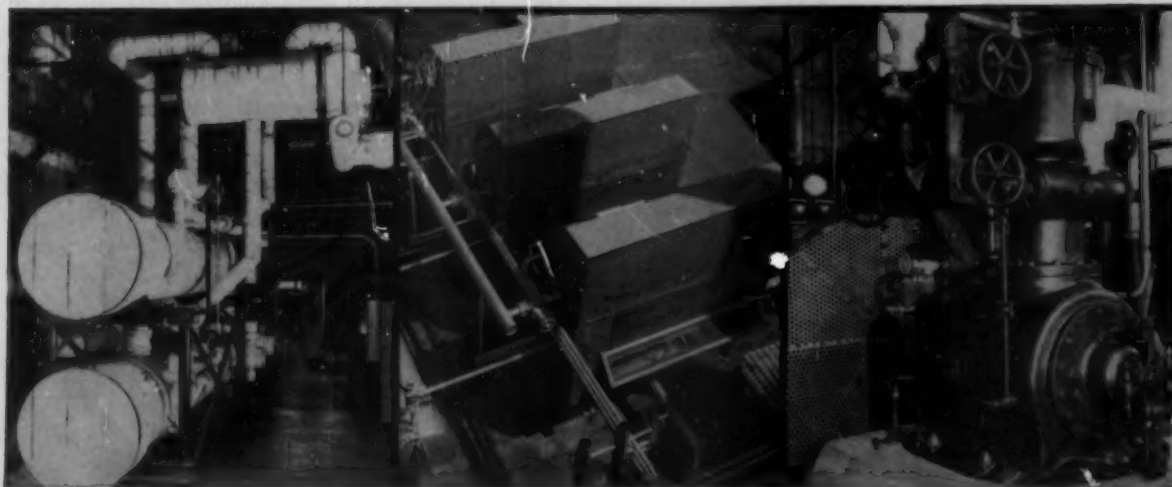
Recent installations made by Mollenberg-

Betz Machine Co., Frick Sales-Representatives at Buffalo.

Let us aid you in applying modern refrigeration and air conditioning to your business. Estimates cheerfully furnished, without obligating you.



Left to Right—WATER CHILLERS . . . CONDENSERS . . . COMPRESSORS IN BEECH-NUT PLANTS

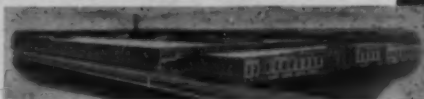


EUTECTIC



Welding News

PLANT, RESEARCH LABORATORIES
and WORLD HEADQUARTERS



Published by EUTECTIC WELDING ALLOYS CORPORATION

40-40 172nd STREET, FLUSHING 38, NEW YORK, N. Y.

"EUTECTIC" CAPS CAST IRON TEETH TO PREVENT COSTLY CAVITIES



(Each tooth required 2½ pounds of alloy for overlaying; each is a foot long. Job was further complicated by sticky coat of grease over the entire gear.)

Hard use of this huge gear meant extreme wear of its foot-long teeth. The result...frequent breakdowns, and finally, complete stoppage.

The gear—part of a large rotating oven in a Northwest aluminum mill—could not be replaced for several months. Concerned over this expensive shutdown, management turned to their local "Eutectic" Technical Representative for a solution.

After inspecting the gear, Eutectic's Technical Representative recommended overlaying the worn teeth with EutecRod 185 FC...a Eutectic

"Low Temperature Welding Alloy"* for torch use.

All 115 gear teeth were overlayed, and the gear was put back in operation. After six months of continuous operation, the overlays have proven unusually wear resistant. Breakdowns have ended...the gear functions with complete dependability. Originally thought of as a stop-gap measure, this "Eutectic" overlaying procedure is now standard. The company also has cancelled its order for a new...and very costly... gear.

TECHNICAL DATA

EutecRod 185 FC is a flux coated alloy of BronzoChrom. Its extremely hard and tough deposits—high ductility and low friction coefficient—makes it perfect for build-ups and overlays on cast iron. Hardness as deposited is BHN 110, with a work hardness to BHN 200.

EutecRod 185 FC doesn't require fusion

of the base metal surface. This permits the very lowest base heats. High heat embrittlement, warping and distortion are eliminated...a big advantage when working with cast iron. For complete technical information about EutecRod 185 FC write to Eutectic's Technical Information Department.

2970 LB. CYLINDER SAVED

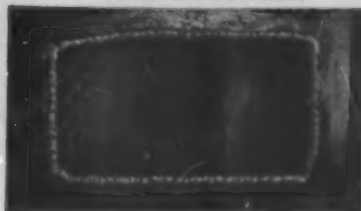
Cylinder is 7½ Ft. High, 42 In. Diameter

A permanent overload on a 3,000 hp engine caused cracks in cylinder wall. Replacement would cost the owner—an Eastern power plant—\$3,100.

After consulting with local "Eutectic" Technical Representative, it was decided to chamfer cracks with Eutec Chamfer-Trode (DC Straight). Its special ecothermic coating concentrates arc and blasts away unwanted metal...no finishing operation is needed.

Welding was done with Xyron 2-25 (AC-DC). This "Frigid Arc" coated alloy produces a high nickel alloy especially balanced to produce dense, smooth, crack-free, machinable deposits without preheat. Ultimate tensile strength is 56,000 psi. After two years in operation, cylinder still operates perfectly—continued excellent service is expected.

TO REPAIR A CRACKED MARINE ENGINE...



...a cast iron plate had to be welded to the outside of the cylinder block. Eutectic's Xyron 2-24 (AC-DC) was used. This alloy's ultimate tensile strength of 50,000 psi permitted the welded plate to withstand pressures of 3 atmospheres.

Xyron 2-24 (AC-DC) has a special core metal with "Frigid Arc" flux coating for application ease. Enables rapid work in difficult, awkward position, since spatter is reduced to a minimum and alloy deposits smoothly and easily.



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2204 Irving Boulevard, Dallas 7, Texas

Eutectic Welding Alloys Corporation
40-40 172nd Street, Flushing 38, N.Y.

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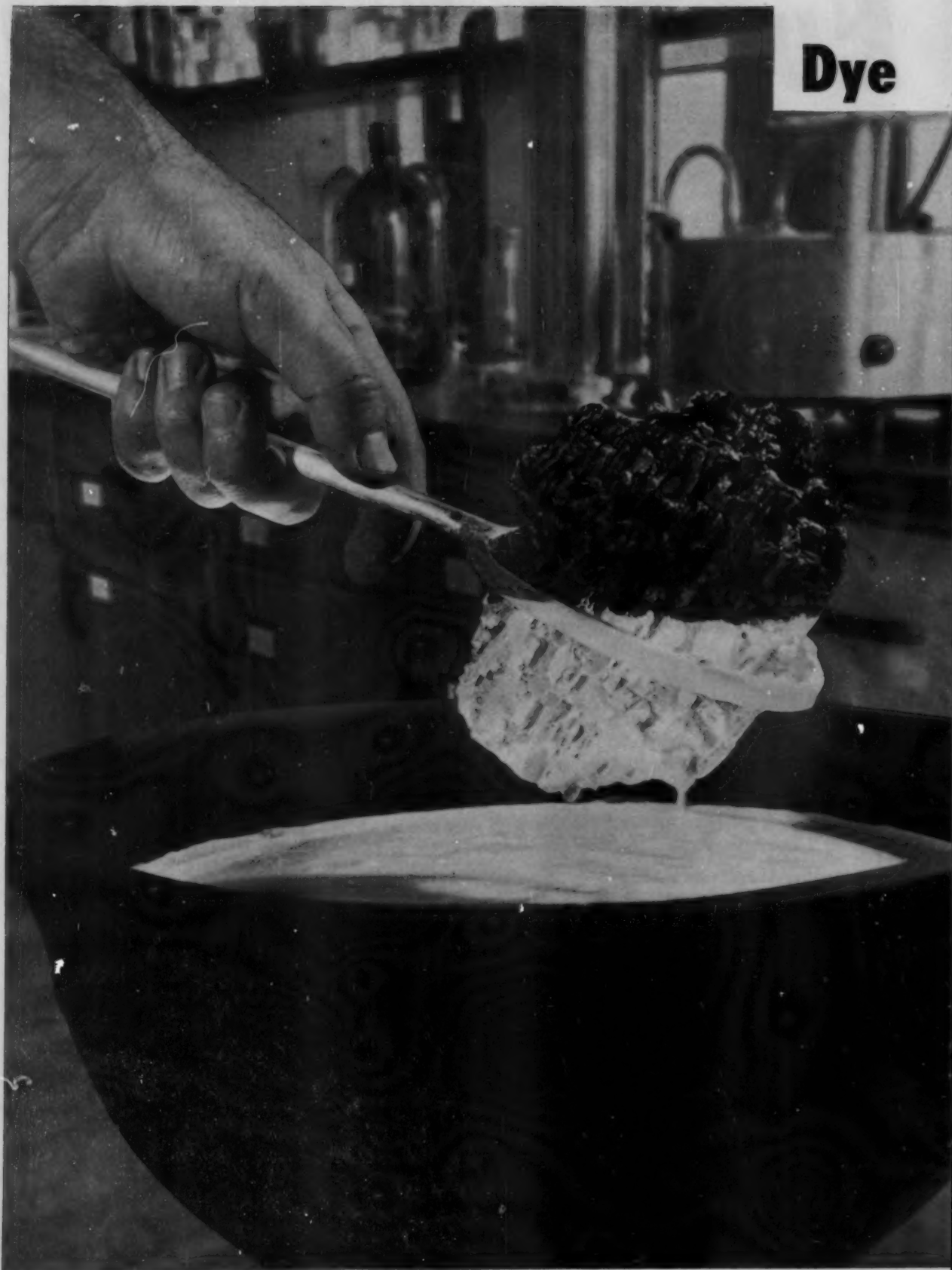
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"EUTECTIC" WELDING HEADLINES • TIME - MONEY - MACHINERY SAVERS

Dye



maker brightens fuel cost picture

**Burning coal at Toms River-Cincinnati saves 20%
on fuel costs, permits clean steam generation**

The Toms River-Cincinnati Chemical Corp. plant in Toms River, N.J. is the most modern plant of its kind in the world. Producing vat dyestuffs requires a large dependable steam supply for chemical processes and heating purposes. To fill these requirements, the power plant at Toms River-Cincinnati is as up-to-date and efficient as the general plant itself. The fuel used for steam generation is *coal* because, on the basis of cost per thousand pounds of steam, the nearest competitive fuel costs 20% more than coal. In addition, thanks to automatic operation and modern equipment, the power plant meets the rigid standards of cleanliness required in such manufacturing operations.

Facts you should know about coal

Not only is bituminous coal the lowest-cost fuel in most industrial areas, as in the case of Toms River-Cincinnati, but up-to-date coal burning equipment can give you 10% to 40% more steam per dollar. Today's automatic equipment pares labor costs and eliminates smoke problems. And vast coal reserves plus mechanized production methods mean a constantly plentiful supply of coal at stable prices.

Technical advisory service

The Bituminous Coal Institute offers a free technical advisory service on industrial fuel problems. We welcome the opportunity to work with you, your consulting engineers and architects. If you are concerned with steam costs, write to the address below. Or send for our case history booklet, complete with data sheets. You'll find it informative.

Consult an engineering firm

If you are remodeling or building new heating or power facilities, it will pay you to consult a qualified engineering firm. Such concerns—familiar with the latest in fuel costs and equipment—will effect great savings for you in efficiency and fuel economy over the years.

BITUMINOUS COAL INSTITUTE

Southern Building • Washington 5, D. C.

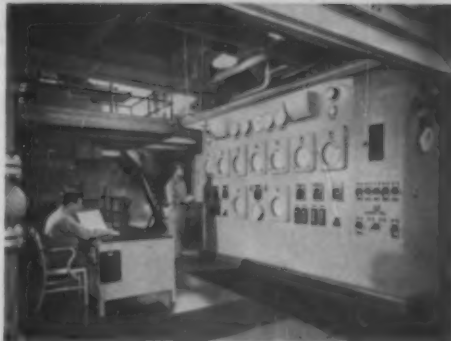
View of boiler room showing both 50,000 lbs. hr. boilers, by Riley Stoker Corp. Each has two burners. Center foreground is automatic weigh scale, by Richardson Scale Co., which receives coal through hopper from live storage bin and passes it to coal feeder. Coal is fed to Riley Pulverizer in basement, then blown back up to burners.



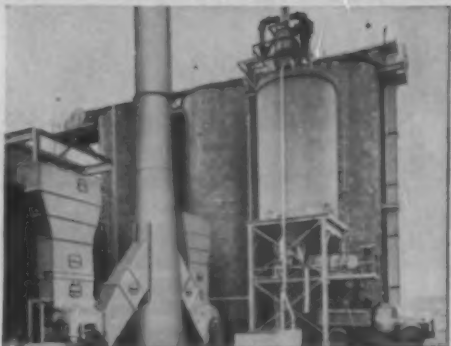
Close-up of Gifford-Wood Roundabout Bucket Conveyor beneath coal storage silos. Transversing feeder-car is used when coal is emptied from silo and conveyed to live storage bin.



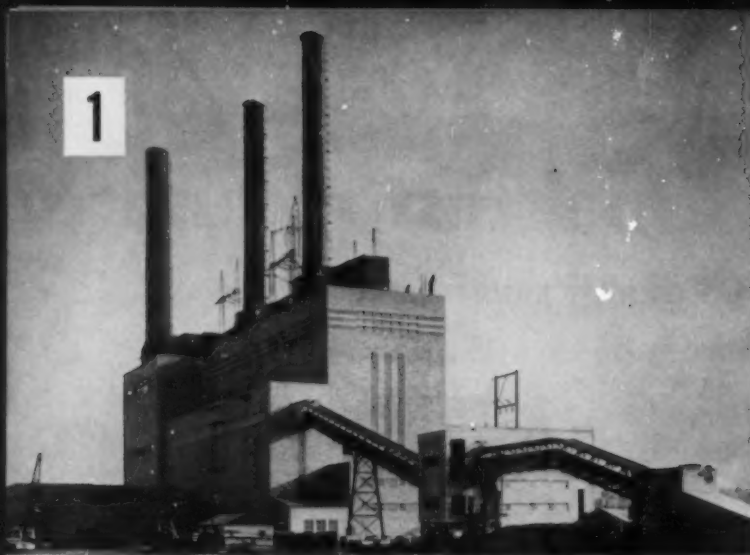
Automatic combustion control and instrument panel by Bailey Meter Co.



Fly ash being loaded on truck through a dustless rotary unloader. Fly ash is collected by Prat-Daniel Mechanical Precipitators. A pneumatic ash collecting system by United Conveyor (with tie-ins under air heater and at base of stack) removes it to this 20-ton ash silo. In the rear are three 330-ton coal silos.



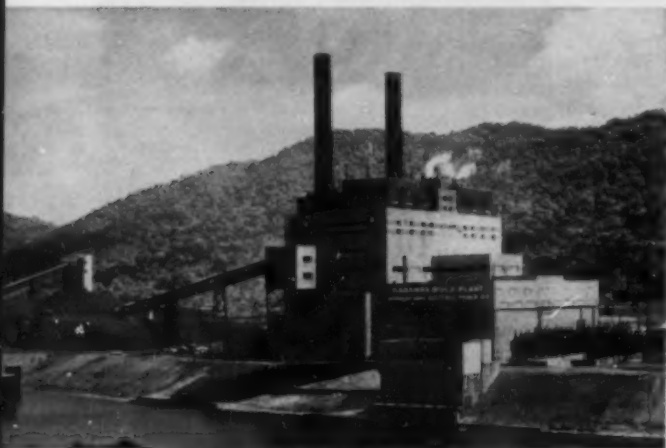
1



TANNERS CREEK 9106 Btu/kwhr

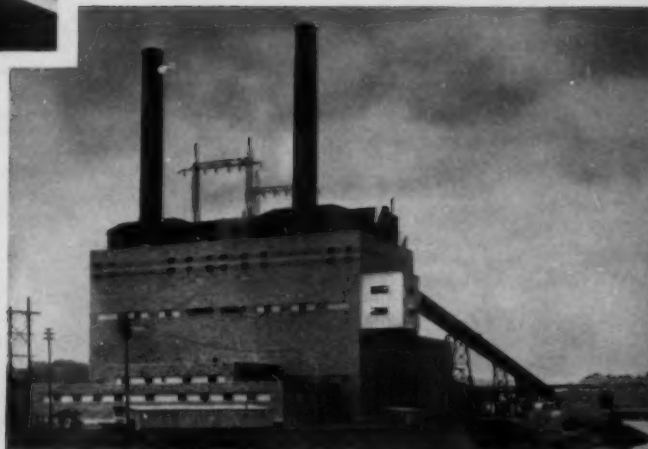
Indiana & Michigan Electric Co. on the American Gas and Electric System
Three B&W Pressure-Fired Radiant Reheat Boilers

**MOST EFFICIENT
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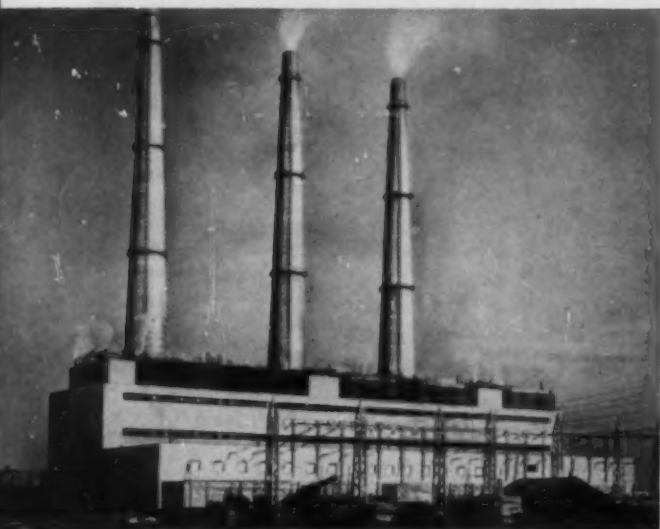
KANAWHA RIVER 9115 Btu/kwhr

Appalachian Electric Power Co. on the American Gas and Electric System
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MUSKINGUM RIVER 9176 Btu/kwhr

Ohio Power Co. on the American Gas and Electric System
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KYGER CREEK 9176 Btu/kwhr

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CLIFTY CREEK 9200 Btu/kwhr

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JOHN SEVIER 9221 Btu/kwhr
Tennessee Valley Authority



ST. CLAIR 9200 Btu/kwhr
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SHAWVILLE 9241 Btu/kwhr
Pennsylvania Electric Co.
Two B&W Radiant Reheat Boilers



RIVER ROUGE 9210 Btu/kwhr
Detroit Edison Co.
One B&W Radiant Reheat Boiler



BAY SHORE 9282 Btu/kwhr
Toledo Edison Company
One B&W Radiant Reheat Boiler

B&W Engineering Developments Pay Off in Power Plant Efficiency

Nine Out of Nation's Top Ten Have B&W Boilers

Here are the ten most efficient power plants in the United States in 1956 as reported by the Federal Power Commission. Their achievement reflects the signal success of the power industry in keeping electricity America's best bargain despite rising fuel and other costs.

A major investment in engineering research and development has made possible these great strides in power plant efficiency. Six years ago only two plants operated under 10,000 Btu per net kwhr. In 1956 there were no less than 47. In addition a great many new units incorporated in older plants are now operating at these high efficiencies. It is significant that nine out of the nation's top ten

plants in terms of efficiency are equipped with B&W boilers.

B&W's role in this vital industry has been a crucial one, covering nearly a century of boiler engineering, design and fabrication. Today, millions of dollars are being invested in major B&W engineering developments—such as the Universal Pressure Boiler, utilization of low grade fuels, basic metallurgical research for high temperatures, and nuclear energy—all to help America's utilities continue to supply abundant, economical, reliable electricity. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

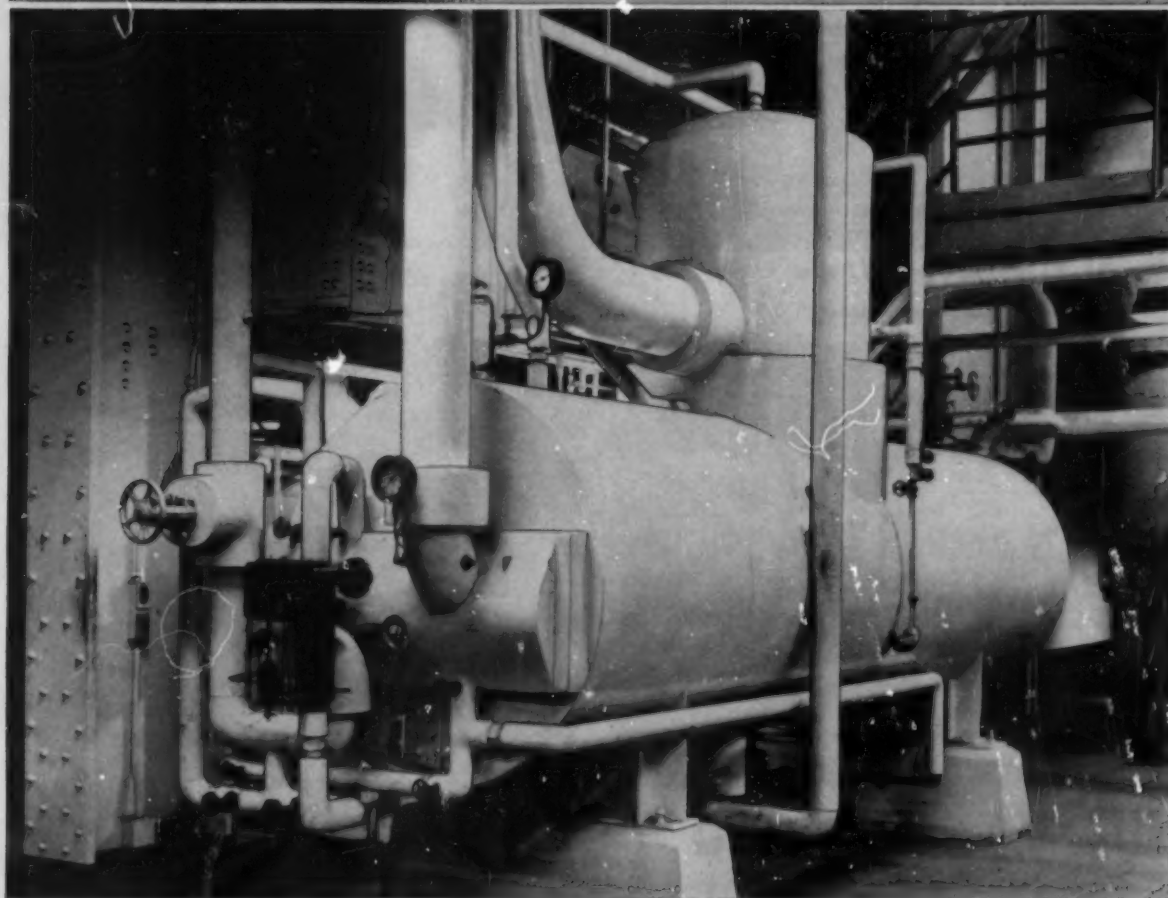
† Ohio Valley Electric Corporation and its subsidiary,
Indiana-Kentucky Electric Corporation, sponsored by these companies:

Appalachian Electric Power Company* • The Cincinnati Gas & Electric Company
Columbus and Southern Ohio Electric Company • The Dayton Power and Light
Company • Indiana & Michigan Electric Company* • Kentucky Utilities Com-
pany • Louisville Gas and Electric Company • Monongahela Power Company**
Ohio Edison Company • Ohio Power Company* • Pennsylvania Power Com-
pany*** • The Potomac Edison Company** • Southern Indiana Gas and
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.2 ppm NOW; .1 ppm COMING SOON

Modern steam and nuclear power plants require boiler water so pure that even the finest drinking water would contaminate it.

Requirements for boiler water make-up of the highest purity can be met readily by Yuba's modern bubble tray evaporators.

Present installations are producing vapor having less than .2 ppm total solids. Shown above is a bubble tray evaporator at the Russell Station of the Rochester Gas & Electric Corp. whose vapor tested

at .2 ppm with a shell concentration of 2800 ppm.

With slight changes, on which Yuba is now working, the purity will be .1 ppm or better. No wonder Yuba can *guarantee* evaporator performance of not more than .5 ppm at 3000 ppm shell concentration!

For *plus* performance, specify equipment manufactured by the Yuba Heat Transfer Division, formerly the Heat Exchanger Division of The Lummus Co. And for solutions to difficult engineering problems, consult Yuba engineers.

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MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Question . . . **IN OUR MACHINE** shop one of our newer machinists, who has been with us a year, has been accused of stealing tools from other employees. A search of his home by the police, and for which he gave permission readily, did find a micrometer gage belonging to the accuser, but the explanation that he gave the police, was that he had borrowed the gage and forgot he had it. The owner of the gage insists he never loaned it to anybody.

Other employees who have lost tools report that wherever the accused man worked before he came to us, the shops suffered from theft. However nothing ever was proved against him.

The police feel they can make the theft charge stick, but our company attorney feels that proving him guilty on this one situation would be a tough assignment.

We have not removed the man from duty. The police want to take him in, and the shop superintendent wants him discharged simply from the standpoint of shop morale. The man insists that if he is arrested or discharged, he will sue the company and certain individuals for false arrest, libel and everything else he can think of.

In view of our attorney's attitude, we hesitate to let this case go to court, while on the other hand the shop is in something of an uproar. Please advise how to handle this situation.

Suggestion . . . **WE BELIEVE** that your attorney is right. The evidence is very weak. However, in view of the shop attitude, his usefulness is ended.

Simple discharge appears to be impractical. Any legal action initiated by this man would put you instantly on the defensive. You then would be obliged to prove him a thief, a most difficult task — or take the consequences.

We recommend that you press on him to resign, promising that his resignation will be followed by a closure of the case. He probably will refuse, but you have at least four powerful persuaders on your side, and should turn them all on him.

1—Emphasize that a conviction in court will ruin his entire future career. If he is arrested and charged by the police, who are strongly confident that they have him "with the goods," he is risking a great deal, unnecessarily.

2—Remind him that his confidence in escaping a conviction has no foundation on absolute fact. Every trial is uncertain as to outcome.

3—Point out to him that, even if freed in court, there will be always persons who will suspect that justice miscarried. This suspicion can be expected to flare up strongly every time somebody's tools disappear, or money is lost from a locker. If he is present, nothing may be said, but there will be plenty of distrust expressed behind his back.

4—Emphasize that the shop people no longer want him among them. Innocent or guilty, they don't want to work with him or associate with him. He can expect to work alone as much as practicable, eat alone, be assigned the most undesirable jobs. In short, his welcome in that shop no longer exists.

In a prototype of this situation, the accused worker shrugged off points 1, 2 and 3, but he realized that the kind of half-life described in number 4, would be more than almost any human being could stand. He resigned.

We expect one of these points will produce a resignation in your case. In the unlikely event that the man stands his ground, you should let the police take over.

In talking with this man, be careful that you do not choose words which imply your belief in either his innocence or his guilt. The strength of your argument lies in absolute impartiality. Convinced of that, he will see the light much quicker.

The Number They Can't Forget



Chapman List 960 Forged Steel Gate Valves

They can't forget it. They can't *afford* to forget it . . . 960 . . . Chapman List 960. You'll find more of these valves at work on more jobs than any other small forged steel gate valve. And it all boils down to two important points . . . performance and working costs.

With Chapman List 960 Forged Steel Gate Valves, wedge faces are super hard . . . *hardened to 800 Brinell by Chapman's exclusive Malcomizing process.* They can't gall. They can't seize. And the seat rings are hardened stainless steel . . . built for rugged service and very easy to replace when necessary. What's more, you have no full-pressure replacing difficulties. You get top performance with the barest minimum of troubles and costs for maintenance.

You can handle, perfectly, anything from 380 psi at 1000°F. to 2000 psi at 100°F. with Chapman List 960.

For higher pressures, you use Chapman List 990.

Sizes for List 960 run from ¼" to 2". Bonnet joint can be either gasketed or ground metal to metal. And you can order rising stem with yoke or rising stem with inside screw.

Look at our Catalog 10.
If you don't have one, write.

The CHAPMAN Valve Manufacturing Co.
INDIAN ORCHARD, MASSACHUSETTS

INDUSTRY SPEAKS



Productive Maintenance

PRODUCTIVE maintenance will serve an ever-growing and important role in the expanded industry of tomorrow, predicts C. E. Sutton, Jr., manager of marketing for General Electric's Service Shops Department. He addressed a recent St. Louis section meeting of the American Society of Mechanical Engineers.

Productive maintenance, he explained, is a carefully engineered maintenance program, tailored to a particular plant and designed with only one goal — to keep unscheduled downtime to a minimum so that optimum production and profit may be realized from the investment in plant, tools, equipment, etc.

In an industrial world of automated manufacturing processes, productive maintenance is the only way of assuring a reasonably profitable and continuing rate of manufacturing activity in a factory, he said.

"Inadequate maintenance in the future will undoubtedly result in a disastrous profit situation.

"As plants become more highly mechanized, or automated, then continuity of operation becomes all important. In order to operate profitably, a highly mechanized plant today must (1) produce as scheduled (2) be able to accumulate reserves for depreciation and obsolescence (3) be flexible enough to make minor changes and (4) must keep unscheduled downtime of the system to a minimum.

"To establish a basic maintenance program, complete equipment data should be gathered; routine maintenance determined; a routine operating control system established; critical maintenance evaluated; and, a critical maintenance program established.

"Some of the results reported by a General Electric department having a model-type program included: (1) average unscheduled downtime reduced 45 per cent the first year (2) facilities costing most to maintain and why were pinpointed (3) replacement of equipment foreseen and most desirable make specified in orderly manner (4) a predetermined work load for maintenance crews established (5) and maintenance budgets based on facts."

Mr. Sutton said soundly engineered productive maintenance programs have been effected in plants varying from large and heavy industry, such as steel and cement, to one as light and small as a race track, which applied productive maintenance to its electric tote board equipment.

"Industry must realize that the more rapidly it progresses toward automation, the more it spends for larger, finer and more elaborate tools, the more urgent and necessary becomes a planned productive maintenance program to insure that profits will be returned from the investment in facilities and equipment," he said.

"The days are gone forever when a good all around mechanic can be the maintenance boss."

Instead, he said, the maintenance engineer will manage the largest direct labor force in the highly mechanized plant of the future.

Top management, Mr. Sutton concluded, must be convinced that *the man responsible for maintenance must be up-graded from the shop foreman level to a position on the management team along with engineering, purchasing, manufacturing, marketing, etc.*



Bailey Meters and Controls for Combustion, Feed Water, Steam Temperature and Condensate at Moores Park Station, City of Lansing, Michigan.

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Fingertip Controls, convenient indicators and trend recorders make steam control room operating duties a pleasure. You get this bonus for your operators when you specify Bailey Meters and Controls.

Bailey is the choice of virtually all the most efficient plants on the Federal Power Commission's heat rate report. Here's why:

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You can be sure a Bailey Engineer will offer the right combination of equipment to fit your needs.

Bailey manufactures a complete line of standard, compatible pneumatic and electric metering and control equipment that has proved itself. Thousands of successful installations involving problems in measure-

ment, combustion, and automatic control are your assurance of the best possible system.

2. Experience

Bailey Engineers have been making steam plants work more efficiently for more than forty years. Veteran engineer and young engineer alike, the men who represent Bailey, are storehouses of knowledge on measurement and control. They are up-to-the-minute on the latest developments that can be applied to your problem.

3. Sales and Service Convenient to You

There's a Bailey District Office or Resident Engineer close to you. Check your phone book for expert engineering counsel on your steam plant control problems.

A133-1



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TIMELY COMMENTS



More Facts . . . Less Irrelevant Detail

PLANT ENGINEERS, operating managers and plant clerical forces may soon be called upon to help top management and headquarters' accountants make important decisions in regard to data gathering and processing.

Only the largest manufacturing plants will actually operate giant electronic computers, but very soon nearly all plants that are part of a large organization will be participating in extensive company computer programs.

Here is the point that needs plant emphasis right now. Choosing the best computer program will be difficult, because these machines are expensive and of various types. Present and past records must form a large part of the basis for selection. What records are available? What records are needed? What records are worthless, or will become worthless? How much local computer machinery will be needed to feed the main computer that will process the data and provide the facts needed for overall management decisions?

Walter W. Finke, president of Datamatic, a division of Minneapolis-Honeywell Regulator Co., recently cautioned executives attending a special American Management Association conference in Chicago that management's mania for facts and insatiable appetite for statistics is miring it in "a labyrinth of irrelevant detail."

To simplify decision-making and to cope with the mushrooming complications of business, management needs more pertinent data, better organized and more comprehensive, he said. Electronic computers, the so-called "giant brains," if properly used, give management a tool for tackling daily operations scientifically. Used in conjunction with such scientific methods of analysis as operations research, the host of factors, considerations and alternatives involved in running a business can be reduced to more comprehensible, workable dimensions.

Scientific methods, by gathering, relating and applying logical interpretations to masses of data, can lay before a businessman an assort-

ment of facts and alternatives in order of desirability and probability of success, Finke explained. The final decision is, of course, still his to make. But for the first time the executive can really handle problems hitherto too complex or simply too large for him to grasp.

Many companies are making a sharp break-away from the already conventional uses of computers, and their steps indicate the trend of evolution of the scientific approach to management.

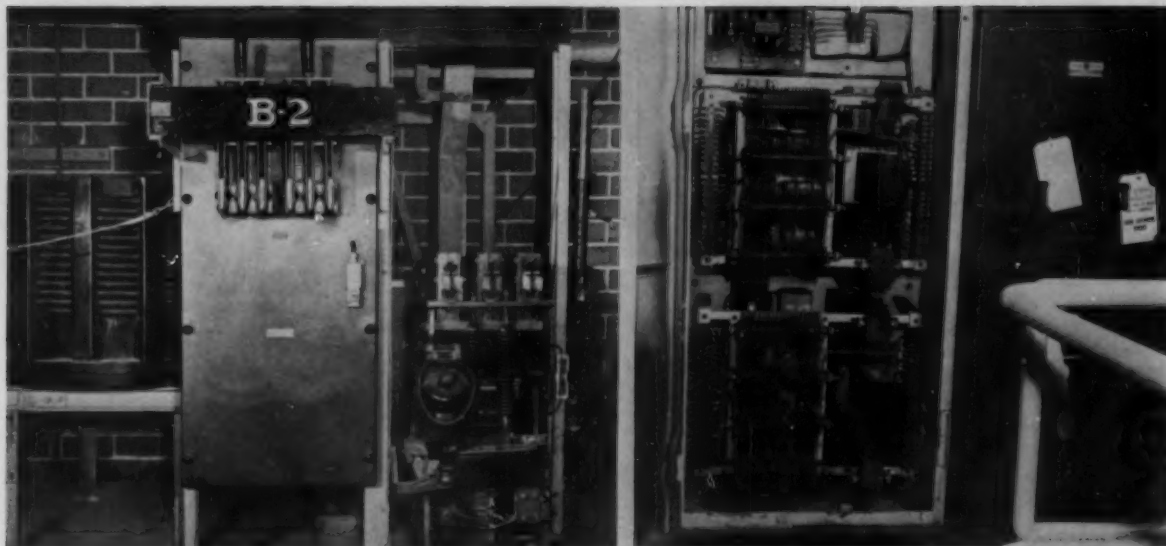
For example, in addition to routine technical calculations (payrolls, billings, etc.) the big "brains" are being used to compute general accounting records, financial reports, departmental expenses, over-all sales analyses, dividends, pension reserves, and property accounting records. One company is looking to the day when it can also be used to handle data on raw materials and finished goods and return on investment by product group — all under budgetary control.

Because business routine and business problems are especially susceptible to these new tools and techniques, Mr. Finke sees the multiple-computer firm becoming the rule rather than the exception.

One type of computer will be expressly used for controlling physical activity and processes, such as the operation of valves in a pipeline. The other, the giant "brain" type will be the heart of a company-wide information and control system. Such computers, he said will relate the planning and forecasting phases of the business to the operating phases.

When the system is fully developed, Finke said management will make decision based on all of the facts as they exist at the moment of decision.

As an example of how far we can go in the plant area, he predicted the elimination of payroll checks as we know them. An employee's salary could be credited direct to his account at a nearby bank.



LEFT — Cathode breaker and isolating disconnect switch showing key interlock between them. RIGHT — Ignitron rectifier auxiliary cabinet showing very poor accessibility for inspection, cleaning, and testing.

Louisiana Engineer Tells How Electric Service Was Improved

Substation Modernized

ELECTRICAL installations are not modernized just for the sake of modernization. Usually such an undertaking is brought about by one or more of the following considerations:

1. Increase in both the number and capacity of production units with consequent increase in power needs.
2. Accumulation of safety hazards in existing installations, usually due to makeshift expansion programs.
3. Lack of proper maintenance facilities.
4. High maintenance costs and unsatisfactory service continuity.
5. Lack of sufficient flexibility.
6. Equipment and facilities present a labor relations problem.
7. Frequent alterations have ob-

By J. N. Fogg
Ethyl Corporation
Baton Rouge, Louisiana

soleted records and complicated installation.

8. Equipment additions and alterations needed to forestall an increase in insurance expense.
9. Need for better fire and explosion protection.
10. Existing basic equipment does not permit economic expansion.

Since all these considerations seldom come to a user's attention simultaneously, it is usually difficult for a company to formulate a modernization program based on the complete scope enumerated above. This article, therefore, has been written to enumerate some of the actual considerations with which we have been confronted

during the past several years necessitating a substation modernization program at Ethyl's Baton Rouge, Louisiana, plant.

We will deal here with these considerations in the order of their importance, which is usually the manner in which they come to a user's attention.

1. Voltage and Current

We originally purchased equipment designed to operate at 550 volts direct current but initially our line voltage requirement was 515 volts. Therefore, it was possible later to add cells to the pot lines to meet higher production requirements without exceeding the rated output voltage of the existing conversion equipment.

This, however, is not always possible. In many cases, station output voltage may be limited by other equipment, such as rectifiers, transformers, supply feeders, and other basic auxiliaries. One point

not to be overlooked in the voltage consideration is the possibility of utilizing either unit regulating transformers or bus regulators to boost the primary voltage if equipment and auxiliaries are adequate for the additional voltage.

The most common problem is the need for additional pot line current. In our case, direct current requirements have increased substantially during the past few years. This problem must be solved by adding generating or conversion equipment, or by revising existing equipment.

As a result of a careful economic analysis, we have thus far met the increased current requirements by adding rectifier equipment.

Usually, an economic survey will show the respective merits of methods of meeting increased current requirements. The studies should consider not only conversion equipment, but also some form of generating equipment as well. One consideration not to be overlooked is the use of gas turbine driven generators, particularly if either steam or air is used in the plant process. In many cases, the economy made possible by these two by-products of gas turbine operation is significant in the overall economic calculations.

2. Safety Hazards

It is not unusual to find that modernization programs are re-

quired to correct certain safety hazards not foreseen when the original installation was made or when later facilities were added.

During the past few years, two such instances have occurred in our company. In one instance, a rectifier transformer suffered a primary-to-secondary failure, subjecting the pot line to several times normal voltage thereby endangering operating and maintenance personnel.

In another instance, grid supply transformer disconnects in two stations were physically different. During the performance of routine preventive maintenance on one of these, and as a result of failure to recognize the difference in the primary connections, two employees were injured by a flashover caused by connecting a merger to an energized 13.8 kv terminal. As a result of these two occurrences, changes were made to minimize safety hazards within the conversion stations.

Considerable judgment must be exercised in determining how far to go in eliminating risks. Occasionally the interrupting capacity of circuit breakers may be exceeded due to circuit changes or the addition of generating equipment. Obviously, when a company is confronted with a large expenditure for increasing the interrupting capacity of breakers, careful consideration must be given to the risk involved. In some

cases, this problem can be solved by the addition of current limiting reactors, and in other cases the only possible solution is replacement of the interrupting device or elect to take the risk involved.

In any survey involving safety considerations, it is advisable to consider such items as proper interlocking of breakers and disconnecting switches, accessibility of equipment for safe maintenance, and particularly the method used to isolate individual units and auxiliaries.

Often too little attention is given to the subject of unit isolation. I feel that this is important, not only for safety reasons, but also to insure continuity of service. Only a thorough engineering and economic study will indicate the procedure to be followed regarding isolation of entire units and their respective auxiliaries.

3. Maintenance Facilities

The objective of all companies is to operate and maintain stations in the most economical manner without jeopardizing the reliability of power supply. A sound preventive maintenance program is essential to secure this end result. I will mention only a few of the necessary maintenance facilities that, in my opinion, are required.

Proper spare parts inventories and storage space should be avail-

LEFT — Oil filter press and vacuum pump test rack. RIGHT — Oil storage tank has separate sections for new and used oil and permanent piping to all transformer locations. The used oil section is normally kept empty and can take all the oil from any one transformer.



able at the site for usual needs.

Tanks of transformers, switches and rectifiers should be opened only in an atmosphere free of contamination and in locations where the atmosphere is controlled from both a temperature and humidity standpoint. Usually substantial quantities of oil are handled in large electrical substations. Therefore, proper oil storage, filtering, and moving facilities are advisable.

Consideration should also be given to handling facilities in order to permit economical and safe removal, inspection and repair of heavy pieces of equipment such as transformers, regulators, breakers, etc. Makeshift rigging methods and equipment, or cranes lacking adequate capacity or in poor condition, invite disaster.

In many instances, equipment is so arranged that a repairman must be a contortionist or possess the patience of a saint in order to locate trouble or to perform preventive maintenance work. We have found it necessary to revise equipment at considerable cost in order to permit ready and safe access.

Many equipment manufacturers, in their constant efforts to improve their product, find it necessary to obsolete equipment prematurely. When seeking replace-

ment parts or units, one finds that this pump, that breaker, or a relay has been obsoleted, and parts are not available. There just is no easy solution to the obsolescence problem. A great help is to have skilled mechanics, alert supervision, competent design engineers, and an aggressive purchasing department.

4. High Costs

The writer can cite from personal experiences some examples of high maintenance costs that required attention in our modernization program. The high failure rate on rectifier transformers is not news. The big question is what can be done about it. There may be, as yet, no clear-cut solution, but there are a number of things which can be done to improve the situation.

Our first rectifier substation was not equipped with anode breakers. We did not have reactors installed between multi-anode rectifiers to limit the rate of increase of fault current during arc-backs. We were overloading the conversion equipment about 25% continuously and, therefore, could not take equipment out of service for preventive maintenance.

The first phase in our modernization program was the installation of both anode breakers

and cathode reactors. Then we installed additional conversion equipment which alleviated the old practice of overloading and provided enough extra capacity so that an adequate preventive maintenance program could be established. These factors have materially reduced the frequency of failures and interruptions. Not many years ago, there were complete station interruptions averaging three to five per day. Today, the rate would be less than one per month.

Recently, our company made available a rectifier transformer and some associated equipment to a manufacturer in order that a testing program could be conducted at the manufacturer's plant for establishing the basic reasons for excessive failures in transformers of this type. We commend the manufacturer for his interest and efforts. I believe that, in the relatively near future, information will be made available to the industry concerning measures to be taken to reduce rectifier transformer failure frequency.

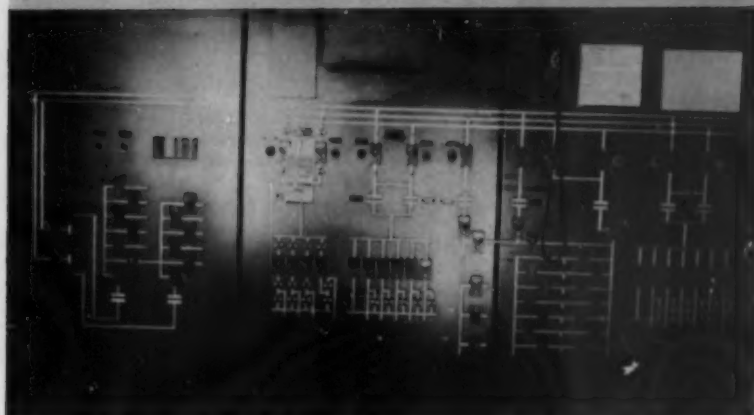
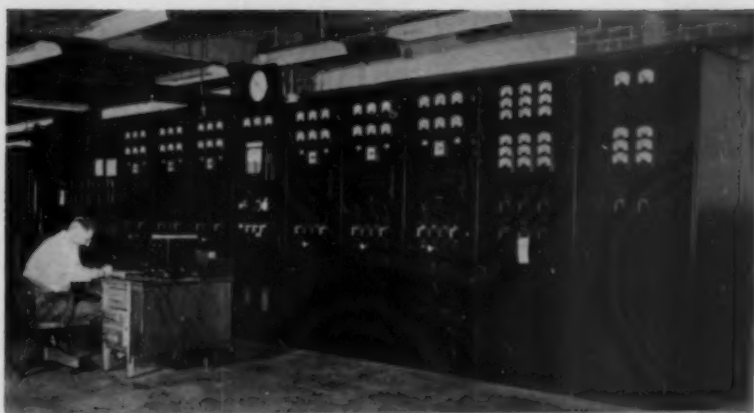
5. Flexibility

Many of the considerations listed at the beginning of this article are so interrelated that no modernization program should be attempted without careful attention to all of those considerations. The subject of flexibility adequate to permit a proper preventive maintenance program is not an easy one to evaluate. When we operated equipment at continuous overloads of about 25%, our service continuity was most unsatisfactory. We were fortunate to purchase some good equipment at a substantial saving, thereby eliminating the necessity for operating the equipment beyond rated load.

After completion of our modernization program, each of our stations had sufficient spare capacity to permit outages for maintenance without overloading the remaining units. This was an ideal condition and permitted a sound preventive maintenance program. Already, however, it has become necessary to increase line current, and some of our unit flexibility

Twelve-tank ignitron rectifier rated at 5,000 amperes and 650 volts.





ABOVE — Rectifier station control board. LOWER VIEW — Supervisory panel with miniature bus for unattended distribution substations.

has disappeared. We know from experience that continuous overloads of 25% are not desirable. It may be wise, however, to allow slight unit overloading, rather than recommend the expenditure of sufficient funds for additional equipment to avoid moderate unit overloading when maintenance work is being performed.

It is completely impractical, however, to allow station overloads to jeopardize sound preventive maintenance. No station will operate successfully over any long period of time without adequate flexibility to permit unit and equipment outages for maintenance and inspection purposes on all equipment.

6. Labor Relations Aspects

Due consideration must be given to maintaining harmonious relations from a personnel stand-

point. If conversion stations are not properly lighted and ventilated, sooner or later this will adversely affect employee morale. In any modernization program, therefore, the labor relations aspect should be considered when defining the scope of the program.

7. Prints and Drawings

Usually, a combination of manufacturer's and construction drawings are used when stations are built. After the station has been in service for a few years, additions and revisions are inevitably made. After this, any resemblance of the original drawings to the actual installation is purely coincidental.

Many times the only persons familiar with the actual installation and capable of diagnosing trouble are members of supervision vested with the respon-

sibility for the maintenance and operation of the station. It is, therefore, good business that a program be established for maintaining complete layout and detail drawings and wiring diagrams. It is also wise to have complete written operating and maintenance instruction manuals available.

8. Insurance

When electrical facilities are insured, they are usually inspected and observed frequently by insurance representatives. Our experience has indicated that these engineers are quite capable and have the background of many industries from which to base their observations and recommendations. They are quick to suggest modernization facilities to permit better and safer equipment operation and maintenance.

In those cases where companies subscribe to outside insurance services, no modernization program should be developed until after a review and discussion with the insurance company engineers. This may not result in a decrease in the insurance premiums, but it may forestall a future request for a rate increase. Also, the ex-



13.8 kv Metal-clad switchgear and vertical lift oil circuit breaker.

perience of the insurance engineers may prove beneficial from an engineering point of view.

9. Fire Hazards

Many electric stations are equipped with oil circuit breakers and other types of potentially hazardous equipment.

Even when companies are covered by insurance, such insurance may not reimburse a company adequately for a serious explosion or fire. A few years ago, when our modernization program was being formulated, we concluded that it was worthwhile to equip our a-c switchgear rooms with automatic CO₂ fire extinguishing equipment and gas alarm relays.

10. Expansion Requirements

Too frequently, modernization programs are formulated from a short range point of view. No one knows exactly where the current race will stop. It is good business, therefore, when modernizing a facility, to give considerable thought to the future.

When a better ventilation system is installed, when bus rooms and switchgear are modernized, when additional conversion or generating equipment is provided, responsible engineers and executives should look ahead. It is quite likely, after this consideration, that some additional expenditures will be involved when the modernization program is formulated;



Automatic fire extinguishing equipment for a-c oil circuit breaker rooms.

however, future developments will most likely prove that these additional expenditures were extremely well justified.

Our modernization program at the Ethyl Baton Rouge plant is now virtually complete, but since progress is an important product of every company, we will continue to study methods and facilities to further improve our installations. This can be accomplished only through capable and

alert general supervision.

In order to offset the possibility of increasing costs, our future program will give careful consideration to such cost saving measures as reducing maintenance and operating manpower requirements through time and methods studies, improved cooling of equipment and auxiliaries with corrosion-free air, and certainly more complete automation in order to improve overall efficiency.

Effective Dehumidifier

A LARGE amount of moisture in the compressed air lines has been a problem of a large metal fabricating concern in Florida. Other than the usual reasons for this is the fact that aftercooler cooling water is in the neighborhood of 80 F. As this compressed air is used for various mechanical devices and spraying operations there have been maintenance and quality problems because of water in the lines.

Two or three different types of mechanical air dryers, working on refrigerating principles, have been

tried with some success as far as removing moisture is concerned, but they required what was considered an abnormal amount of maintenance.

A recent installation of a Vi-Speed non-mechanical dehumidifier manufactured by the Van Products Company of Erie, Pennsylvania has produced instrument-dry air at less than 25% of the original installation costs of other types of dryers.

The unit is basically a tank filled with tablets of a salt-like compound which absorbs moisture

from the air, and converts it into drops which flow to the bottom of the tank and drain off through an automatic trap. The only expense in operating the equipment is occasional replacement of chemical consumed. Laboratory checks show that this chemical does not contaminate the air. As the quantity of moisture removed is reduced as the speed of the air passing through the unit increases, low pressure air requires a larger unit than high pressure air for dehumidifying a given quantity of air per hour.

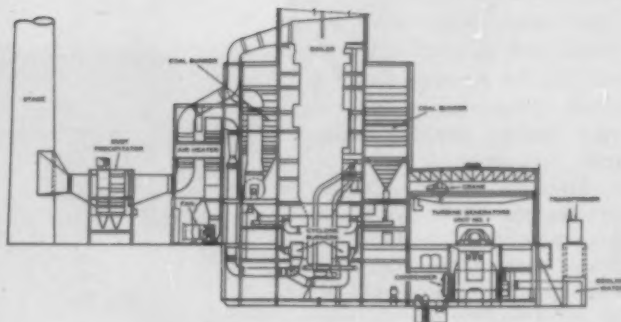
By C. F. WEST
Plant Manager

Continental Can Company, Inc.

Memphis Power Plant

THE THOMAS H. ALLEN Generating Station being constructed for the City of Memphis will be of modern compact design, consisting of three units with a total rating of 750,000 kw. The plant will cost approximately \$121,000,000, and the first unit is expected to begin operation late in 1958.

The station was designed and is being constructed under supervision of Burns and Roe, Inc. The engineers have released the following list of principal equipment:



FEED-WATER EQUIPMENT

- Boiler-feed pumps, 9 _____ Pacific Pumps, Inc.
Horizontal, double case, 12 stage, 3475 rpm, 2100 gpm at 3160 psig. Pump temperature 300 F, 5000-hp constant-speed motor and variable-speed fluid couplings.
- Condensate pumps, 6 _____ Byron Jackson, Inc.
Vertical four part, multisection, 1160 rpm, first section 2710 gpm, second section 2930 gpm, third section 3060 gpm and fourth section 3210 gpm, at 84, 32.5, 55 and 117 psig total head, respectively.
- Feed-water heaters, 9 _____ Cochrane Corp.
Vertical, jet-type direct-contact open heaters with internal vent condensers, 1,233,000 to 1,368,000 lb per hour at 7.6 to 37.3 psia respectively.
- Feed-water heaters, 12 _____ Alco Products, Inc.
Horizontal, closed type, U-tube, 2 pass, integral drain coolers, 2,000,000 lb per hour at 3075 psig $\frac{1}{2}$ in. OD, 17-, 16- and 14-gage Monel tubes.
- Deaerators, 3 _____ Cochrane Corp.
Horizontal tray, 1,434,000 lb per hour with integral storage tank of 20,000-gal capacity.
- Demineralizers, 1 _____ Graver Water Conditioning Co.
Activated carbon filters, 3, 500 gpm each. Vacuum degasifier, 1, 500 gpm. Exchangers; cation, 3, anion, 3.
- Coal Handling Conveying Equipment _____ Link Belt Co.
- Precipitators, Electrostatic, 6 _____ Aerotec Corp.
- Combustion and Feed-water Controls _____ Bailey Meter Co.

MISCELLANEOUS EQUIPMENT

- Soot blower air compressors, 4 _____ Worthington Corp.
Three stages, reciprocating, 4800 cfm, 275 psig, 327 rpm.
- Bearing water coolers, 6 _____ Condenser Serv. and Eng. Co.
Horizontal, 1 pass, cooling 800,000 lb per hour from 120 F to 95 F in 1-in. OD, 18-ga tubes.
- Miscellaneous centrifugal pumps _____ Worthington Corp.
- Traveling water screens, 9 _____ Link Belt Co.
- Coal scales, 21 _____ Richardson Scale Co.
- Turbine-room cranes, 2 _____ Shaw-Box Crane and Hoist Div.
- Auxiliary-power switchgear _____ General Electric Co.
- Switchyard equipment _____ General Electric Co.
- Bus ducts—main and station _____ I-T-E Circuit Breaker Co.
- Transformers _____ General Electric Co.
- Motors _____ General Electric Co., Elliott Co., and Westinghouse Electric Co.

STEAM PRODUCTION EQUIPMENT

- Steam generators, 3 _____ Babcock and Wilcox Co.
Radiant, pressurized, reheat type, multiple cyclone, fired with crushed bituminous coal and/or natural gas. Rating — 2,000,000 pounds of steam per hour continuous at superheater outlet conditions of 2475 psig and 1053 F. Four-hour peak capability — 2,100,000 pounds of steam per hour. Reheater designed for normal continuous rating of 1,620,000 pounds per hour at 1053 F and four-hour peak capability of 1,690,000 pounds per hour. Cyclones are arranged for opposed firing, four on front and three on rear of boiler. Water-cooled furnace walls, continuous-tube economizer, continuous-tube primary superheater, platen-type continuous-tube secondary superheater, continuous-tube reheater.
- Air heaters, 6 _____ Air Preheater Corp.
Ljungstrom regenerative, vertical shaft, 185,000 sq ft surface each.
- Fans, 6 forced draft, 6 recirculating gas _____ Sturtevant Div.
Forced-draft fans, 1750 rpm, 1,160,000 lb per hr air at 80 F and 57.7-in. W.G., double inlet, inlet vanes, outlet damper. Recirculating gas fans, 700 rpm, 345,000 lb per hr at 650 F and 14.1-in. W.G., single inlet.
- Soot blowers _____ Diamond Power Specialty Corp.
- Slag and fly-ash system _____ United Conveyor Corp.

POWER-GENERATING EQUIPMENT

- Turbine generators, 3 _____ Westinghouse Electric Corp.
Three-cylinder, tandem-compound, triple-flow, impulse-reaction, condensing reheat type, 3600-rpm turbines, 2400 psig, 1053 F, reheat 1053 F. Eight extraction points, 1.5 in. Hg absolute pressure exhaust. 320,000-kva, 3-phase, 60-cycle, 24,000-volt, hydrogen inner-cooled generators. Exciters, three 1150 kw, 375 volt, 718 rpm gear driven; three pilot exciters, 10 kw, 250 volt, 718 rpm and one spare motor-driven common standby.
- Surface condensers, 3 _____ Worthington Corp.
Horizontal, 2 pass, divided water box, 135,000 sq ft each, 1,375,000 lb per hr, 63 F cooling water.
- Circulating water pumps, 6 _____ Worthington Corp.
Vertical 1250-hp motors, 360 rpm, 63,500 gpm at 50 ft head.
- Valves _____ Henry Pratt Co., Crane Co., Lewis Supply Co. (Manning, Maxwell & Moore, Inc.)
- Air ejectors, 3 _____ Worthington Corp.
Triple element, 2 stage, separate inter- and after-condensers.

ELECTRONIC instruments for measuring metal wall thickness from one side have been developed and perfected to a point where they are now in extensive use. Consequently the cost of inspecting steel pipe, pressure vessels, chemical containers, etc., has been greatly reduced.

Instruments may either be purchased and personnel trained in their use, or services of an organization specializing in this type of work may be obtained, depending upon frequency and number of readings desired. In general, test services should be used when a large number of readings are desirable at one or two year intervals, whereas equipment should be purchased if weekly or monthly tests are contemplated.

The Audigage, shown in Figure 1, operates on the ultrasonic (high frequency sound wave) resonance principle, and measures thickness by determining the frequency at which resonance of the ultrasonic waves occur. The instrument has a range of 1/16" to 12" of steel, weighs 23 lb, and has a self-contained dry cell power supply. It will also measure the thickness of other materials, with high elastic constants, such as brass, aluminum, glass, etc.

This instrument was first offered on the market in the fall of 1946, and since that time over 1,000 instruments have been placed in use throughout industry, in plants that represent more than 95% of the refining capacity in the United States, as well as in numerous chemical and steel plants.

The original laboratory design established the fact that there was a definite need for this type instrument throughout industry. Several difficulties were encountered in operating this first instrument under field conditions, however, and it was therefore redesigned on the basis of information obtained through actual plant use.

The newer model can withstand rough usage, incorporates the best available components, and is not seriously affected by high humidity. Suggestions received from users, such as longer cable length and greater thickness range, have

been incorporated. Sensitivity and the ability to measure material with very rough, corroded surfaces has been increased. A visual indication of thickness has been added, to facilitate measurements in noisy locations.

The Vidigage shown in Figure 2 also operates on the ultrasonic resonance principle. This instrument's range is .005 to 2.5" in steel, aluminum or other materials with high elastic constants. It is not quite as portable as the Audigage, and it requires an a-c power supply.

Overall dimensions on the Model 14 Vidigage are 14" x 12½" x 24" deep and weight is approximately 60 lb. Up to several hundred feet of extension cable can be used between the instrument and the transducer. All thickness measurements are read directly from a calibrated scale over a 14" cathode ray tube. By being able to read

thickness directly, it is possible to get several hundred readings in a few hours.

APPLICATIONS

Refineries

The Audigage is used extensively in determining the extent of corrosion in refinery equipment, and has been used for location of defects such as hydrogen blisters or laminations. Many plants have set up routine periodic inspections of their equipment, and are obtaining adequate data concerning corrosion rates and overall condition of plant equipment.

Several large refineries in the Southwest have two of these instruments available for peak inspection periods such as unit shut-downs. The use of these instruments often results in considerable savings in the time required for plant or unit shut-

Ultrasonic Measurements



Fig. 1. The Audigage

Modern method for determining inside condition of tanks, digestors, pressure vessels, pipes and tubes

By E. F. POTTS
Engineering Test Services, Inc.
Tulsa, Oklahoma



Fig. 2. The Vidigage

downs. A typical set-up is shown in Figure 3.

A survey is made prior to shut-down, to determine what equipment should be replaced, what equipment requires further inspection, and what equipment need not be disturbed. Such information expedites inspection and maintenance procedures during the shut-down, and saves the time which would otherwise be consumed in inspection of equipment in good condition.

Elimination of even a few hours of "down" time often justifies the cost of the instrument, dependent of course upon operating conditions and the size of the plant. Cases have been known where downtime worth \$1,000 per hour has been cut as much as 24 hours. At the present time, this type of inspection is limited to equipment operating below 400 F with the standard instruments. Special de-

tector heads satisfactory for temperatures up to 750 F are now available.

Such instruments facilitate the complete and rapid survey of fractionating towers and other large insulated pressure vessels which have been taken out of service for inspection. These vessels are usually inspected from the inside and it is therefore not necessary to cut and replace exterior insulation.

In some cases, doubtful areas can be located visually and rapid thickness measurements taken; in other cases erosion and corrosion occur over wide areas which cannot be located visually, and an over-all survey must be made. Checking of more than a few points was impossible with the old "drilling and plugging" method.

One plant for example, makes complete surveys of insulated digesters and finds that about 200

thickness readings in each vessel can be made at a cost approximately equal to that previously required to drill, caliper, and re-weld four test holes.

The instrument is often used on piping and on filled storage vessels, such as gasoline storage, butane tanks, etc. Accuracy is not affected by the contents of the pipe or vessel, nor by deposits such as coke or scale. Signal strength will be reduced when such conditions are encountered, and a skilled operator can often determine liquid levels or the presence of carbon. On pipe less than 6" in diameter, performance can be improved by the use of curved crystal detector heads cut to fit the contour of the pipe.

Paper Mills

The method of checking extent of erosion, and corrosion on digester walls at a Southern paper

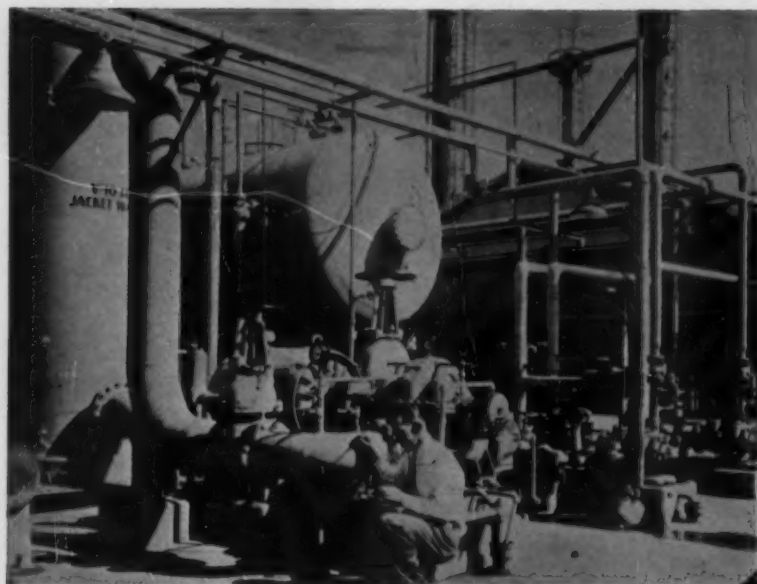


Fig. 3. Typical use of the Audigage

mill was very slow. Test holes were drilled through suspected spots in the 1½" wall and thickness was measured with micrometer, the vessel being condemned when thickness has been reduced to ½" or less by the chemical and abrasive action.

After measurement, the holes were plugged by welding. When large areas are involved, thinning is difficult to notice visually. In such a case, of course, the number of holes which could be safely drilled was limited by safety considerations and the fact that corrosion rate is usually accelerated in the weld area.

Digesters at this mill are 40'6" high and 10'6" in diameter. Exterior is covered with 2" insulation. Since they contain saturated steam at 100 psi during the process period, the absolute need for periodic inspection can be understood. Rupture of a vessel could be very expensive and dangerous to plant personnel.

They now use an "Audigage" for making complete thickness surveys of all digesters in use in the plant. About 200 readings are taken on each vessel. Usually eight readings are taken around the circumference of vessel, at 2' levels throughout the height. Ends are also checked.

During the first surveys, test

holes were drilled at seven locations where the "Audigage" had been used. In this way, an indication of accuracy of the new method was obtained. Instrument readings were found to check very closely with micrometer readings at drilled points. The maximum disagreement reported is 4½%, but most readings are within 2% agreement.

During the test mentioned above two of the five digesters were found to have dangerously thin

areas in walls, and were removed from service. Visual examination and drilling of comparatively few test holes could not have accurately determined condition of these vessels.

One digester which had caused concern because of its visible worn surface was found to have sufficient metal remaining for further use. Thus, a considerable saving resulted by extending the useful life of this vessel.

The insurance inspector approved the use of this method after he was shown how close the "Audigage" readings agreed with micrometer readings.

By using the Vidigage the number of readings obtained could be at least doubled over the same period of time as compared to the Audigage. Typical Vidigage use is shown in Figure 4.

Storage Tanks

A recent internal corrosion survey conducted at The Plantation Pipe Line station, Baton Rouge, Louisiana, is a typical example of Audigage surveys in pipe line operation. Seven refined product storage tanks, ranging in size from 35,000 to 80,000 bbl capacity, were inspected.

Metal thickness measurements were made on the walls and roofs of five tanks containing gasoline,

Fig. 4. Typical use of the Vidigage.



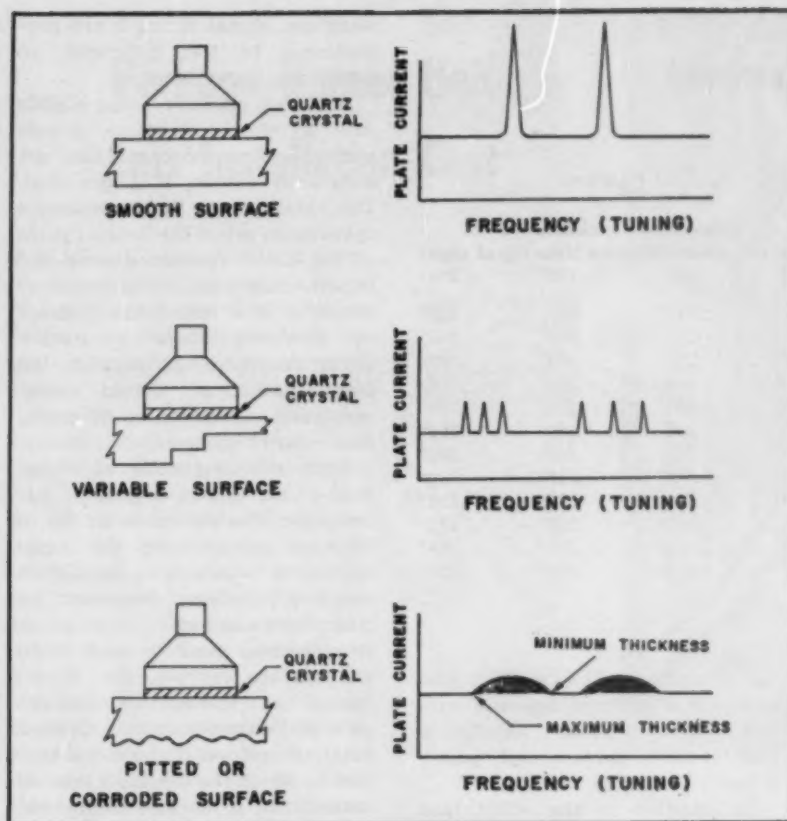


Fig. 5. Resonance peaks vary with surface

diesel fuel, or kerosene. Measurements were made on the walls, roof, and bottom of an empty tank also. A total 556 thickness readings were obtained, for a total cost of \$734.93. This cost includes charges for the test engineer and ultrasonic equipment, his transportation and expenses, and additional equipment and personnel necessary for access to the sides of the tanks above ground level. Except for the measurement on bottom plates in the empty tanks, all readings were taken from outside.

Plates in each ring of the tank were 8' wide, with 6 rings per tank (in 5 of the tanks) making a tank height of about 48'. Three measurements were taken on each plate, 6" above the bottom edge, at the center, and 6" below the top edge. All test points were on vertical lines down the north, east, south, and west sides of the tank, making a total of 72 thickness readings on the walls of tanks with 6 rings. In addition, 20 readings

were taken on each tank roof at carefully designated locations. In tanks having "pontoon roofs," readings were taken inside the pontoons as well as on other sections.

Locations were carefully designated by measurements from convenient seams, etc., so that future readings can be taken in identical locations. Whenever signals indicated that the surface opposite the transducer was corroded or pitted, such information was recorded.

A "bosun's chair" was used to move the test engineer up the approximately 48' sides of each tank. A rope block and tackle was attached to the top of the tank, the bosun's chair secured to the lower end, and the test engineer together with his equipment, raised or lowered by an assistant on the ground. Fortunately, the paint on the tanks was smooth and had good ultrasonic transmission properties, so accurate readings were obtained without the nec-

essity of removing paint.

Future measurements at identical locations are planned, and will be compared with present readings to determine corrosion rates.

Analysis of ultrasonic signal strength and width indicated slightly pitted surfaces and scale in some of the tanks. An interesting point is that apparently corrosion and scale in some of the tanks, occurred most frequently on the north and east sides. This cannot be definitely proved now, since original thicknesses are unknown.

Since the above tests were completed, detailed surveys utilizing the new Vidigage and extension cable were made at an average rate of about 700 readings per day. In these tests, the operator and equipment was stationed at a central point, and an assistant with the transducer moved up and down the sides of the tank, by means of portable scaffolding. About 6,000 readings were obtained for a total cost of \$1,200.00, or approximately 20c per reading.

Pipe Lines

Other surveys have been made in pipe lines, either by taking readings at bell holes or at exposed locations such as river crossings. In one particular case, detailed thickness surveys were made at several exposed pipe line river crossings without removing the pipe line from service. The pipe had been exposed to the elements over a number of years, and external corrosion was evident. Since the surface to which the transducer was to be applied was pitted, it was necessary to smooth it with a "disk sander." A portion of the data obtained in this survey is shown in Table I.

Boiler and Heater Tubes

Boiler tube surveys have been made both with the Audigage and the Vidigage. The Vidigage is preferable, since tubes are concentrated in one location, and all are of the same approximate thickness. In this type of work, tubes

(Continued on next page)

Ultrasonic Measurements—Continued

TABLE 1 — Thickness Reading on Natural Gas Pipeline

Distance from Zero Reference	Original Thickness	Measured Thickness (Degrees Counterclockwise from top of pipe)			
		0°	90°	180°	270°
10 feet South	.3125"	.284"	.312"	.310"	.300"
8 feet South	.3125"	.300"	.310"	.305"	.307"
6 feet South	.3125"	.297"	.288"	.309"	.292"
4 feet South	.3125"	.290"	.268"	.309"	.302"
2 feet South	.3125"	.285"	.251"	.285"	.286"
1 inch South	.3125"	.220"	.236"	.290"	.270"
1 inch North	.3125"	.262"	.270"	.305"	.285"
2 feet North	.3125"	.286"	.307"	.305"	.310"
4 feet North	.3125"	.229"	.310"	.305"	.310"
6 feet North	.3125"	.241"	.310"	.295"	.312"
8 feet North	.3125"	.263"	.303"	.317"	.319"
10 feet North	.3125"	.317"	.313"	.322"	.326"

are checked in a vertical line in the critical area, at intervals such as 2 to 4 feet. Access to the tube walls is by bosun's chair or scaffolding.

In one case, internal pitting and corrosion was found to exceed the limits set for the equipment, and the tube was condemned on this basis alone.

ANALYSIS OF SIGNALS

The signal strength or amplitude of resonance peaks is high when measuring materials with a uniform thickness that provides a good reflecting surface opposite the 1½ square inch area of the transducer. It is reduced and broadened when the reflecting surface opposite the crystal search unit or transducer is rough and pitted since there is an exact resonance frequency applicable to each different thickness under the 1½" crystal diameter. Figure 5 illustrates these conditions.

A skilled operator is able to select the approximate center of this resonance band, and therefore, an average thickness approximately midway between the "peaks and valleys," is obtained. A qualitative analysis of the condition of the unseen reflecting surface can be obtained if other factors, such as scale, are comparable. Signals are classified as "good," "medium" or "poor" on the origi-

nal data sheets. The "good" signal indicates a uniform opposite surface, the "medium" usually a slightly pitted surface, and "poor," a badly corroded surface.

In addition to the effect that rough and pitted surfaces have in the reduction of signal strength, it is also possible to reach a point where thickness variation under the 1½" crystal diameter is so great that resonance peaks will blend together, and no definite signals can be obtained. In general, when the "peak-to-valley" depth of pitting under the transducer exceeds 20% of the total thickness, or if it exceeds one-half wave length (approximately ¼" in steel at 1 megacycle) it will be impossible to measure thickness. In such cases, this condition is recorded, and the transducer moved a few inches until a definite resonance can be obtained.

Accuracy is not appreciably affected by liquids or deposits such as coke or scale, on the opposite side of the plate, although signal strength will be reduced when such conditions are encountered. A portion of the sound waves are reflected and a portion refracted at interfacial surfaces separating two materials that have different acoustical impedance (product of velocity and density), such as steel and water, or steel and scale. The amount of reflected energy, and

therefore, signal strength are proportional to the difference in acoustical impedance.

A skilled operator using a slide rule to check resonance points and calculate thickness can get accuracies within ± 1 per cent. The ability of the instrument operator to select the central point of the broad resonance peak obtained when material is pitted or corroded is a determining factor in obtaining these accuracies. These results make possible the determination of annual corrosion rates, effectiveness of corrosion control systems, etc.

Since the amplitude of vibration of the quartz crystal is microscopic, the crystal must be in intimate contact with the metal surface to which it is applied. A coupling medium between the quartz and steel plate, such as oil, or glycerine, must be used to fill any surface cavities, etc. Waves cannot be transmitted through scale and only very rarely through paint. Therefore, if the metal surface to which the crystal is applied is corroded, it must be completely scaled, and any roughness removed by a "disk sander." In general, about ¼ of the surface under the 1½" diameter transducer must be clean, bright and "flat."

Ultrasonic equipment, either audible or visible, when used by a trained operator, provides a practical field method of obtaining large numbers of thickness readings at a comparatively low cost. Classification of signal strength enables trained personnel to qualitatively analyze the condition of the opposite surface, as to degree of pittings, etc., provided that other variables, such as surface and transducer contact, are relatively uniform.

Accuracy obtained by personnel trained in use of this equipment is within $\pm 1\%$, thereby improving safety limits and making possible determination of corrosion rates exceeding a few mils per year.

Engineering Test Services, Inc., specialists in ultrasonics and other non-destructive testing methods, serve Southern industry thru offices in Tulsa, Houston, and Atlanta.

Package Burner Unit Cuts Installation Cost

A GAS-OIL burner with integral air register not only cut installation cost but also proves more economical and dependable in operation, experience of the Biltmore Dairy, Charlotte, N. C., has shown.

Seeking a burner with quick response, plant manager B. A. Pope decided in 1956 on a newly designed Air Ring package unit of Iron Fireman (Model RWL-76). He has found that it responds quickly when milk processing begins and can be closed down rapidly when the run ends. Load is usually 100 boiler horse power; peaks go to 175.

Installation costs were cut because the unit includes a complete, pre-packaged air and fuel system. No special combustion chamber, checkerboard floor, or firing arch had to be built as the complete burner and air supply system was bolted right to the front of the HRT boiler. Shut-down time during conversion was therefore kept at a minimum.

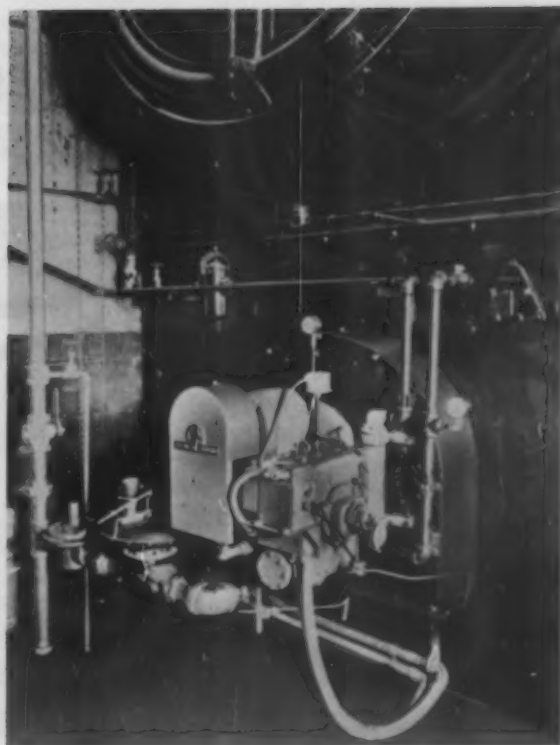
Since installation "dependable uninterrupted service and minimum maintenance" have characterized the operation of the burner, Pope reports.

"The ability to function smoothly with close tolerances of output has considerable value to the operation of our milk processing plant," he says. "Steady, dependable steam pressure is available at all times regardless of changes in load."

With natural gas, the AirRing burner at Biltmore has a capacity of 11,250,000 Btu input per hour. It will produce 215 boiler horse power, 175% of the boiler's rating. In the standby oil burner any grade of oil can also be used — from No. 2 to No. 6 without change to the burner or meter control settings. Fuels can be switched instantly. Oil capacity is 76 gallons per hour.

Spot checks have indicated a saving over previous steam costs for heating and processing. One

This complete fuel and air system was bolted right to the HRT boiler.



reason is that the air supply for the burner is introduced around the burner head for more efficient combustion. With this new design, the fuel and air are mixed at point of flame.

All fuel and air controls in the package unit are interlinked and synchronized for precise control of fuel-air ratio throughout the entire

firing range. The wall-mounted control panel was factory built with all instruments installed, wired and tested.

The Biltmore installation was made by Heat and Power Equipment Company of Charlotte. A. M. Stephenson of Charlotte was the Iron Fireman sales and service representative.

Sprinkler System Lowers Premiums

REALIZING that savings in production costs mean greater profits, one supermarket chain in a large Southeastern city has been able to save approximately \$10,000 yearly in insurance premiums by practically eliminating the fire hazard in their large general warehouse and bakery. These savings were accomplished with the installation of a Moore Automatic Sprinkler Fire Protection System.

Structures protected by this automatic sprinkler system include

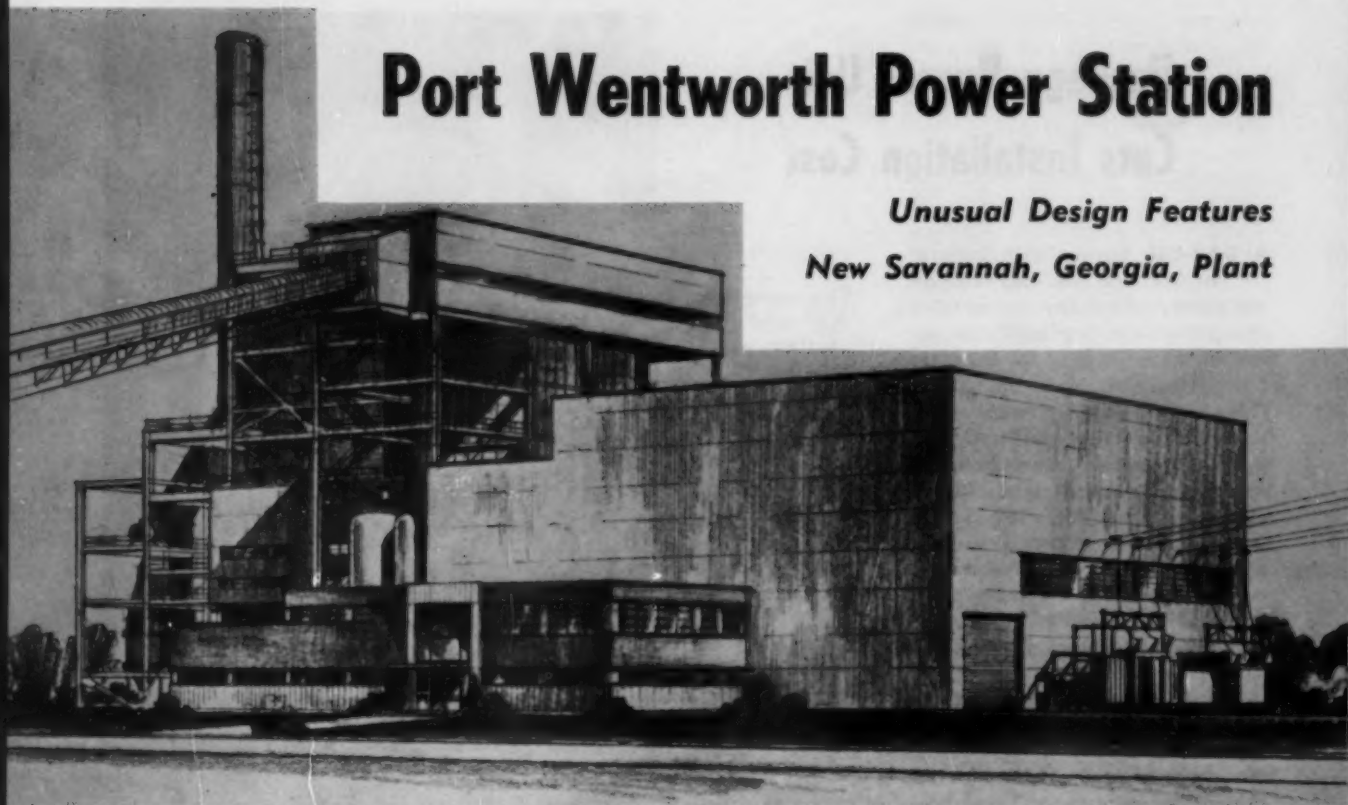
the general warehouse covering 155,000 sq ft, and the bakery, covering 50,000 sq ft, both constructed of tilt-up concrete walls and poured concrete roofs.

Based on premium reductions of approximately \$10,000 yearly, this Moore Automatic Sprinkler System will pay for itself in 10 years, and earn a 10% return on the investment each year thereafter. These figures are based on premium of \$1.9c before the system was installed, and a rate between 4c and 5c after the installation.

This system was designed, fabricated and installed by Moore Pipe & Sprinkler Co., Jacksonville, Fla.

Port Wentworth Power Station

*Unusual Design Features
New Savannah, Georgia, Plant*



An architectural drawing of the Port Wentworth Power Station Unit No. 1 being built for the Savannah Electric & Power Company in Savannah. Engineered and constructed by Stone & Webster Engineering Corporation, the new power station includes several noteworthy design features.

OUTSTANDING feature in the design for the initial installation of the new Port Wentworth Power Station being built for Savannah Electric & Power Co. is the use of a reheat turbine generator with a 40,000 kw name plate rating.

Specifications for the construction of Unit No. 1 at Port Wentworth located 9 miles up the Savannah River from the Company's Riverside Station provide for coal burning facilities — an innovation since coal has not been generally used as industrial fuel in the Savannah area.

Actually, the 40,000 kw name plate rating turbine generator will be the first modern day reheat unit to be installed in so small a capacity. It will also be the first unit of its size ever installed for steam conditions of 1450 psi, 1000 F, 1000 F reheat.

Detailed specifications for the

WILLIAM F. ALLEN, JR.
Mechanical Engineer, Stone
& Webster Engineering Corp.
and

KENNETH C. LASSETER
Vice President, Savannah
Electric & Power Company

installation call for a single casing, single flow reheat turbine for the stated steam conditions with a preferred standard hydrogen-cooled generator rated 58,824 kva at 30 psi gage hydrogen pressure.

Steam will be supplied by one 375,000 pound per hour boiler designed to burn pulverized coal, heavy fuel oil and natural gas; however, facilities will be installed initially to burn coal with heavy fuel oil as a stand-by fuel.

Capability of this initial installation at Port Wentworth was determined by the load require-

ments of the Savannah Electric & Power Co. system. This utility, as with many other systems, is faced with a phenomenal increase in demand for electric power. The demand has posed a real problem for regulated investor-owned utilities to provide the required service.

While on a national average the industry has been doubling its generating capacity every ten years, the Savannah system has had five-fold increase. In 1948 Savannah had 34,500 kw generating capacity. By the time the new unit at Port Wentworth goes into service in 1958, the system will have 175,000 kw generating capacity.

In attempting to make it possible for Savannah Electric & Power to meet the demand with the most efficient possible facilities and most economic operation,

several unusual design features were recommended by the engineers.

Up to the time that the Port Wentworth unit was engineered, only seven reheat turbine generators of less than 75,000 kw rating had been built. Of these units the smallest have name plate ratings of 50,000 kw. In addition, many studies for various power systems throughout the country had indicated that reheat was not justified in capacities less than 90,000 to 100,000 kw for the systems studied.

With this background, it is logical to ask "why reheat for Savannah?" The two principal factors which make this unit an economical selection for the Savannah system are: (a) the relatively recent development of a turbine with a single flow exhaust end, and (b) reduction in differential cost of reheat and non-reheat steam generating units of the required size.

New Reheat Unit Instrumental in Design

The development in 1954 by General Electric of a reheat unit design in the required size having a single flow exhaust end, was an important factor in influencing the design of the station.

All non-reheat extracting, condensing units 40,000 kw and larger have been built with double flow exhaust ends. The double flow exhaust was not deemed particularly advantageous even for a non-reheat unit for Savannah's relatively high circulating water temperatures and consequent high condenser back pressures. The single flow exhaust, however, is more suitable for the reheat turbine than for the non-reheat turbine because its condenser flow is less than for the non-reheat unit for the same kilowatt output.

In addition, a single flow exhaust turbine costs about \$160,000 less for the turbine generator

alone, exclusive of the savings in the turbine foundation and the surface condenser.

The second major factor which influenced the selection of the reheat turbine generator is that the steam generator manufacturers reduced the differential cost between reheat and non-reheat units in the 40,000 kw size to approximately 70 per cent of that estimated prior to the time of making the plans for Port Wentworth.

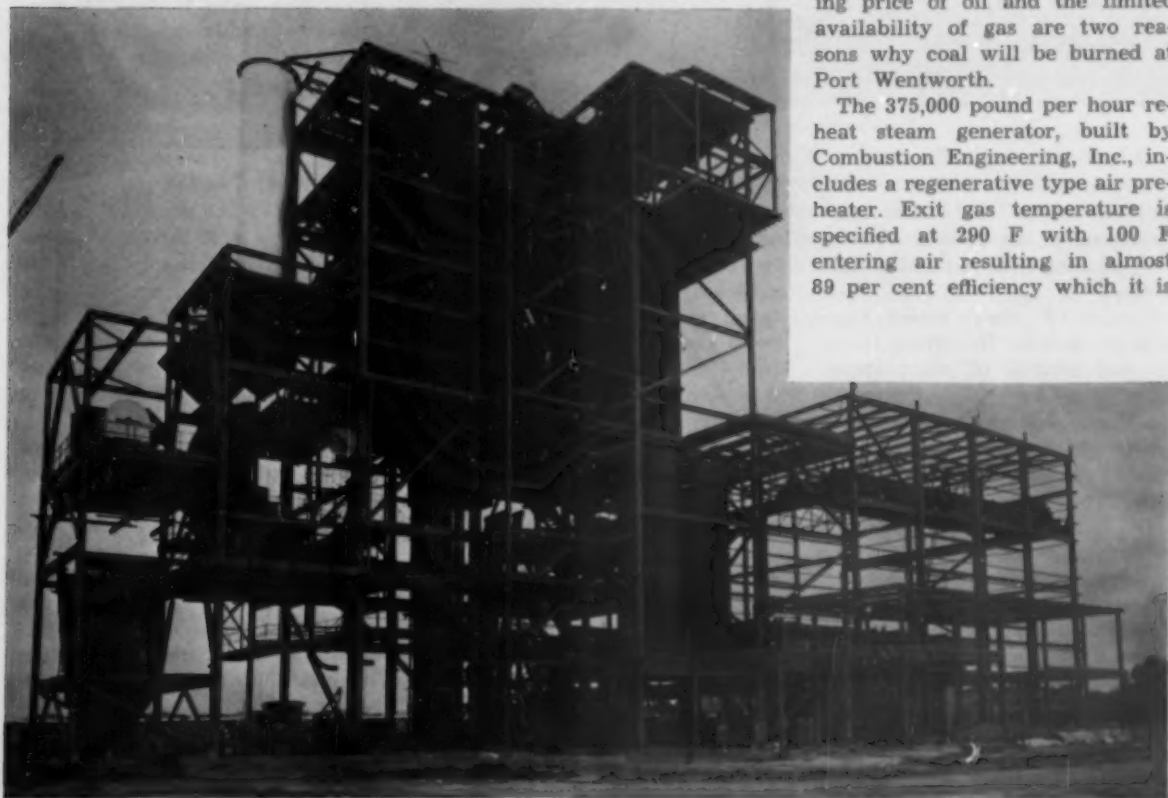
Preliminary studies on oil and natural gas firing showed that the saving in the annual fuel bill expressed as a gross return on an additional investment of about \$330,000 for the reheat unit would exceed 20 per cent at the expected 75 per cent capacity factor for the unit. With coal firing and a somewhat lower price for coal, the gross return would be reduced proportionately. The net return on additional investment would be less than stated by the amount of fixed charges.

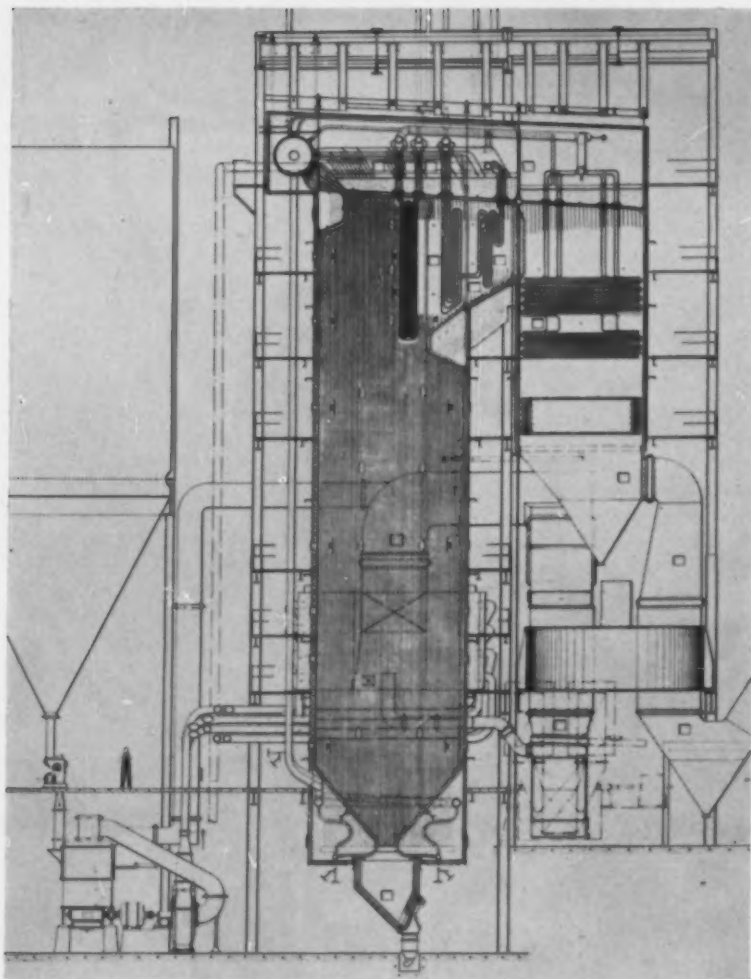
Cool 'New' to Savannah Area

Coal has not been burned in Savannah's Riverside power station for many years but the rising price of oil and the limited availability of gas are two reasons why coal will be burned at Port Wentworth.

The 375,000 pound per hour reheat steam generator, built by Combustion Engineering, Inc., includes a regenerative type air preheater. Exit gas temperature is specified at 290 F with 100 F entering air resulting in almost 89 per cent efficiency which it is

Structure of Unit No. 1 Port Wentworth Station during construction.





Cross-section of the reheat steam generator at Port Wentworth. Its capacity is 375,000 lb/hr at 1560 psi and 1005 F temperature. It was designed and built by Combustion Engineering, Inc.

costs less to use slightly more steel than it would to drive the additional piles required if the equipment was spread out over a larger area. The stack is of steel with pneumatically applied concrete lining.

Condensing System

At Port Wentworth, the condensing system will include a 35,000 sq ft surface condenser equipped with 1 inch OD admiralty tubes. Savannah Electric, after experience at its Riverside Station, found that much less fouling occurs with the 1 inch tubes than the $\frac{3}{4}$ inch tubes.

The C. H. Wheeler condenser will be provided with an integral reverse flow mechanism which permits reversal of the flow of circulating water through the condenser and greatly increases the length of time required between condenser cleanings.

The main steam system consists of a single 10-inch main steam line, a 14-inch hot reheat line which branches into the two 10-inch hot reheat lines at the turbine and a 12-inch cold reheat line which branches into two 10-inch lines at the turbine. The steam lines are of minimum length without loops and about \$35,000 was saved by using rigidly anchored boiler steam headers instead of flexible headers.

One of two full-sized boiler feed pumps with variable speed hydraulic coupling will take water from the deaerating heater storage tank and pump through the first and second point horizontal high pressure heaters to the economizer.

Studies were made which indicated that hydraulic couplings would result in substantial fuel savings for the expected capacity factor and load duration curve for the unit and would also result in

believed makes the steam generator one of the most if not the most efficient units of its size built to date.

Control of reheat steam temperature will be by tilting burners and control of main steam temperature by spray atomization. Since de-superheating water is taken from the feed water system between the highest pressure heater and the economizer there is no loss in efficiency as there would be if de-superheating water was taken ahead of the highest pressure heater or if water bypassed the high pressure turbine and was sprayed in the reheater.

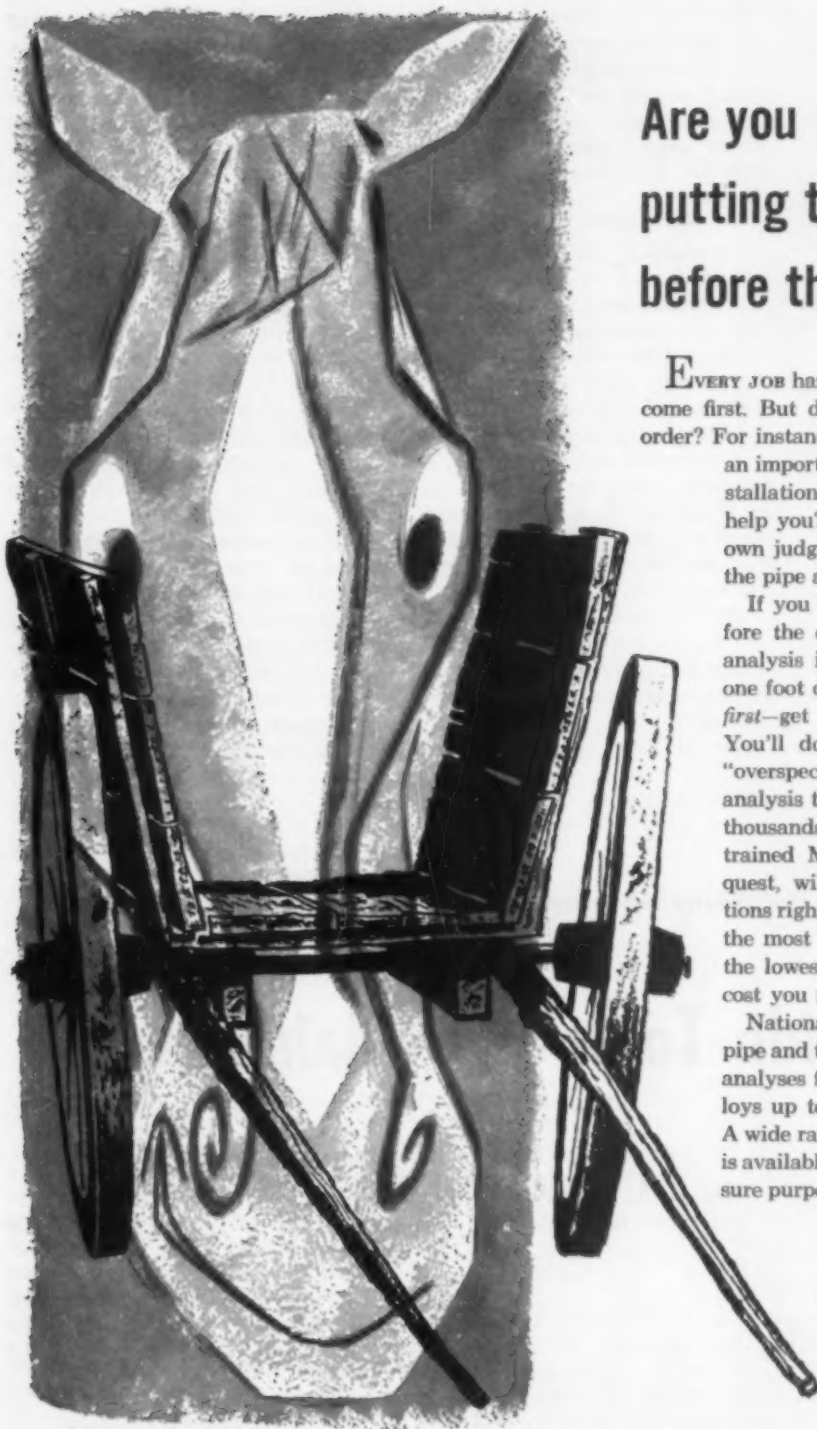
Steam air heating sections are provided in the duct work between the forced draft fan and the air preheater inlet to raise the temperature of air entering

the preheater and prevent fouling of the preheater surfaces at the low exit gas temperature specified.

Steam for air heating will be taken from the third extraction point except at low loads and extreme low ambient temperature conditions when steam will be taken from a 1500/150 psi pressure reducing station. Use of extraction steam will increase the by-product power output and thus improve station heat rate.

One forced draft fan is provided at ground level and one induced draft fan is provided on the steel.

The arrangement with the induced draft fan and also the steel stack supported on steel at the rear of the boiler was used because the soil conditions require a pile foundation support and it



Are you putting the cart before the horse?

EVERY JOB has a natural sequence—first things come first. But do we always do things in that order? For instance, if you have to order pipe for an important, and probably expensive, installation, do you call in the experts to help you? Or do you rely solely on your own judgment, and go ahead and specify the pipe analysis you think is right?

If you believe in putting the horse before the cart, you'll want to *know* your analysis is exactly right before you buy one foot of pipe. You'll do the *first* thing first—get in touch with National Tube. You'll do this because you know that "overspecifying" (ordering a costlier steel analysis than the job calls for) can waste thousands of *your* dollars. Our technically trained Mill Service Force, at your request, will then analyze your specifications right on the job, and will recommend the most suitable material for the job at the lowest cost to you. This service will cost you nothing.

National Tube manufactures seamless pipe and tubes in a complete range of steel analyses from low carbon through the alloys up to and including stainless steels. A wide range of sizes and wall thicknesses is available for every mechanical and pressure purpose.



NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York



NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

less maintenance on the pump equipment.

Demineralization Equipment Used in Plant

Another noteworthy design feature of the Port Wentworth station is the use of demineralizing equipment. With high pressure boilers, the need for high quality boiler feed water becomes increasingly important and demineralized water in general is of better quality than evaporated water.

The demineralizing plant is designed to produce 43,000 gallons per day of make-up water to the condensate system.

A study was made to determine the preferability of using city water, which is filtered river water, or deep well water as a source for either evaporators or in a demineralizing system.

Results indicate that for Unit No. 1, alone, the lowest overall annual cost would result from the use of evaporating city water. However, since the capacity of the

demineralizing plant is uniform and does not depend on load, it will provide ample make-up for Unit 2 as well as Unit 1, and the demineralizing plant will have the lowest overall annual costs after Unit No. 2 is installed.

Structural Aspects

Structurally the power station will consist of an enclosed building housing the turbine auxiliary bay, the firing aisle around the boiler and the conveyors over the coal bunker. The boiler and the coal bunker will be open framed.

Although an accurate estimate was not made for Unit No. 1, an estimate made for the last unit at Riverside Power Station indicated that \$100,000 was saved by the use of outdoor construction for the boiler.

The outdoor construction was not carried out completely because of the hurricane threat and rainy season experienced in the Savannah area.

The saving in the turbine

room structure if open air type would be greatly nullified by the necessity to provide weatherproof turbine generator construction, weatherproof motors, controls and instruments within the turbine room area, and increased maintenance costs.

The initial installation of Unit No. 1 is designed to permit expansion to an ultimate station size of 450,000 to 500,000 kw. The location for Unit No. 1 was based on the design requirements that the site be adequate for the ultimate station size and to facilitate the installation of yard coal handling equipment at the lowest possible cost and require only a minimum operating force.

It is believed that for the first year or two of operation — or until others are built — Unit No. 1 with an expected station heat rate at full load of approximately 10,000 Btu per kw hour, will be the most efficient condensing, extracting steam electric generating plant of its size in the United States.

North Carolina — Close Relationship between Maintenance and Production

How Carbide Tools Are Maintained

DREXEL Furniture Company probably has the largest program of making and maintaining their own carbide tools of any furniture company anywhere. The carbide tooling department maintains all of the carbide cutting tools for its six furniture production plants and manufactures most of these tools for the plant.

This program began back in 1949 on a small scale with a grinder made in Drexel's machine shop for sharpening carbide tipped saws. This grinder was made to grind only the cutting surface on the periphery of the saw which meant that when the grinding of side clearance was necessary or

By L. S. INSCOE, JR.

Drexel Furniture Company

a new tooth needed, the saw had to be returned to its manufacturer or a professional carbide shop. Since that time the work has increased until we have five grinders and make practically all of our own tools.

Making and maintaining saws and cutters for six busy furniture plants involves procedures that cannot be developed overnight. We have gradually learned over the past seven years many of the things that can and cannot be

done with carbide, and we are learning more each day. Because of the general lack of knowledge concerning the use of tungsten carbide in the woodworking field, Drexel has had to learn many things the hard way, by trial and error.

Maintenance Program

In 1949 when we began grinding our own saws, we had very few carbide saws and knew very little about maintaining them. As time went on and our plants began to appreciate the tremendous advantage the carbide tipped saws have over the carbon steel saws, we purchased more saws and built

PLEASE NOTE:

The W. R. C. Smith Publishing Company advises that pages 53-56 of the January 1958 issue of **SOUTHERN POWER AND INDUSTRY** were dropped due to editorial release complications. The issue is thus "complete" as microfilmed.

UNIVERSITY MICROFILMS, INC.



The Yarway Impulse started a new era in steam trapping...

...it began in 1935, when Yarway applied a unique principle of thermodynamics to steam traps—and the Yarway IMPULSE Steam Trap was born.

Since then over 1,225,000 Yarway IMPULSE traps have proved themselves so well in service that today many other type traps are regarded as obsolete—an understandable reason why the Yarway IMPULSE type of steam trap is being imitated.

To industry, the Yarway IMPULSE trap makes possible a new high in thermal efficiency of equipment, a new low in trap operating maintenance ... resulting in increased production and higher profits.

THE THERMODYNAMIC PRINCIPLE

This is the principle on which the Yarway IMPULSE trap design is based—that variations in temperature of water discharging through two orifices in series cause variations in pressure in an intermediate chamber between the orifices, and that these changes in pressure may be utilized to open and close the trap valve.

ONE MOVING PART

There is only one moving part in a Yarway IMPULSE trap—a small, stainless steel valve. The entire valve assembly can be replaced in 5 or 6 minutes. It is the simplest of all steam traps to service.

EQUIPMENT HOTTER, SOONER—STAYS HOT

At "start up" the little valve opens wide to discharge air and condensate continuously. This brings equipment into production in the quickest possible time. The valve then actually floats on the condensate load, maintaining highest, steady temperatures.

A YARWAY IMPULSE STEAM TRAP TO MEET EACH TRAPPING REQUIREMENT

Research and development in the Yarway Steam Laboratory, plus intensive field testing, have produced a line of steam traps—all of the Yarway IMPULSE type ... to efficiently meet each of the following classes of trapping service:

Normal requirements for pressures up to 600 psi call for Yarway Series 60 and 120 IMPULSE Traps in six sizes, $\frac{1}{8}$ " to 2".

Light loads for pressures up to 600 psi call for the $\frac{1}{2}$ " Yarway No. 20-A and No. 120-A IMPULSE Traps.

Heavy loads for pressures to 600 psi call for the extra high capacity Series 40 Yarway IMPULSE Trap, available in five sizes, $\frac{1}{2}$ " to 2 $\frac{1}{2}$ ".

Highest pressure and marine requirements up to 2500 psi are met by the Yarway Integral-Strainer IMPULSE Trap, in six sizes, $\frac{1}{2}$ " to 2", flanged, screwed and socket weld types.

PLUS ADVANTAGES

- Small size and light weight
- Easy, low cost installation
- Minimum maintenance
- Non-freezing
- Stainless steel construction
- No adjustment of valve or seat needed for any pressure
- Low initial cost

NATIONALLY STOCKED, SOLD AND SERVICED

Over 270 Industrial Distributors stock and sell Yarway IMPULSE Steam Traps ... and over 35 Yarway field engineers are available to help you select the right steam trap for the job.

Write for free, new bulletin "The Why and How of Steam Trapping."

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.

Southern Representative:

ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY impulse®

...a good way to specify steam traps



Series 60 and 120 for normal requirements.



$\frac{1}{2}$ " No. 20-A and No. 120-A for very light loads.



Series 40 for very heavy loads.



Integral Strainer Impulse Traps for highest pressures and marine use.

another grinder to grind the side clearance. When we became equipped to do the side grinding we were also able to replace broken teeth which we could not do without a side grinder.

In 1953, Mr. Vono Baker, our machine shop foreman who has been in charge of our carbide maintenance from the beginning, completed the first carbide tipped saw made "By Drexel." It should be said here that the lion's share of the credit for our carbide program today must go to Mr. Baker. Without his great knowledge of saws, gained by years of experience as a saw filer, and his willingness to try new things, our carbide tooling department never could have grown to the size it now is.

After making that first rip saw, we have gone on to make several hundred more. According to our cost records, we have been able to make these saws at about one-half the cost of a comparable saw we might purchase. We also feel that the quality of our saws is as good as any and better than many that are on the market.

One way in which we have saved money in the manufacturing of the saws is that we have taken our old carbon saws and made them into carbide tipped saws. We also buy our carbide tips from the manufacturer in large quantities which affords us another saving.

As anyone who has had experience with carbide saws knows, it has not been easy to make these saws and be sure of the perfect cuts that our rip saws must make. In analyzing our problems we found that our troubles were not all caused by the imperfection of the saw.

True, we have had to retention some saws and grind different angles on others, but we found that improper use by the machine operators was giving us a lot of trouble. We also realized that a lot of the saws we had to repair had been damaged, not while in use, but by careless handling by our operators and by people delivering the saws to and from the plants. These facts and others prompted us to have a training

program for our machine operators.

Training

This school was held in the rough machine departments of each plant by our personnel department. Without being too technical, we explained to the men the characteristics of tungsten carbide, and why it must be handled with care.

The cost of replacing a tooth that is carelessly broken was pointed out and the proper method of placing the saw on the machine was demonstrated.

The men were urged to keep the saws, when not in use, in the bright red wooden cases that we provide for each saw.

It was explained that a dirty or improperly placed saw collar can cause a perfectly good carbide tipped saw to produce a rough cut.

It was stressed that saws should be sent in for regrinding periodically and that it is false economy to keep using a saw after it begins to dull.

We are convinced that our training program paid dividends because we have had far less complaints on rough cutting saws and the damage due to careless handling has dropped off sharply. By the grinding record kept on each saw we are able to keep a close check on the hours a saw has been used before it is returned for grinding. Saws sent in that are damaged by being used after they are dull have decreased considerably.

Use Expanding

In addition to our saws, we also make and maintain carbide cutters for moulders, shapers, and routers. These cutters are not as universally used as the carbide tipped saws but we are making and using new ones every day. We have made many heads for the moulder shaper and router where a straight cut is needed and we have made several contour cutters for these machines. We make contour cutters for wood from carbide only for items that are standard and are used over and over again.

On occasions when we cut plas-

tic laminates, we make carbide contour cutters where needed. Our carbide tooling shop has been very useful for making odd and special tools.

We make two types of straight and contour cutters for shapers and moulders. One type incorporates the standard "slip knife" type head where we insert either solid carbide knives or steel knives inlaid with carbide, depending on the type slip head used. The other type is a solid steel head, milled out in our machine shop, and having inlaid carbide cutting edges.

If time permits, we buy our carbide moulded in the shape we intend to use it. For instance, on a contour knife, we send a sketch of the desired shape to the carbide manufacturer and they rough out the shape before the carbide is sintered or hardened. This saves countless hours of grinding with expensive diamond wheels.

Drexel is proud of its carbide tooling department and we expect it to grow more and more as we continue to find better uses for tungsten carbide in the wood working industry.

Fig. 1. Wood cases for carbide tools. Square box for moulder and shaper heads has spindle at bottom to keep the cutting edges from touching box.

Fig. 2. Magnetic chuck and grinder used to grind blank blades for groove saws and special cutters.

Fig. 3. Setting up for grinding a carbide moulder head. Cupped wheel is 180-grit diamond.

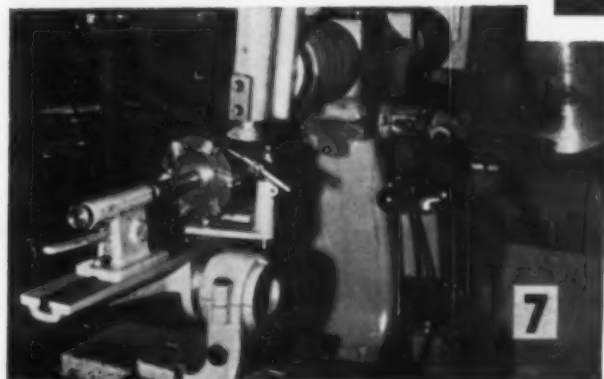
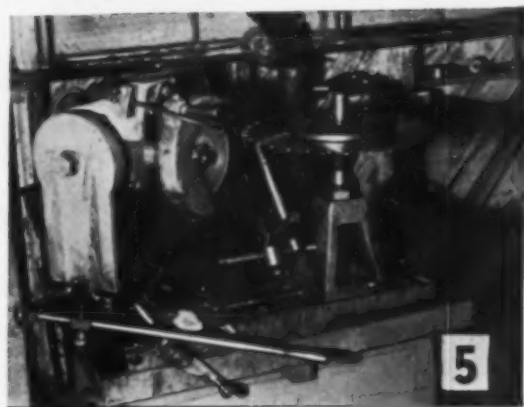
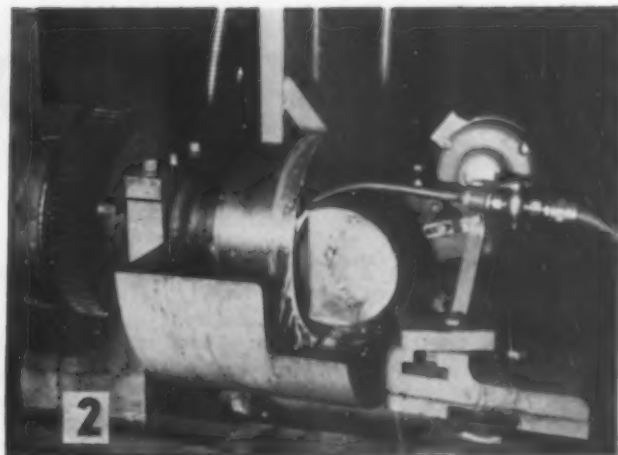
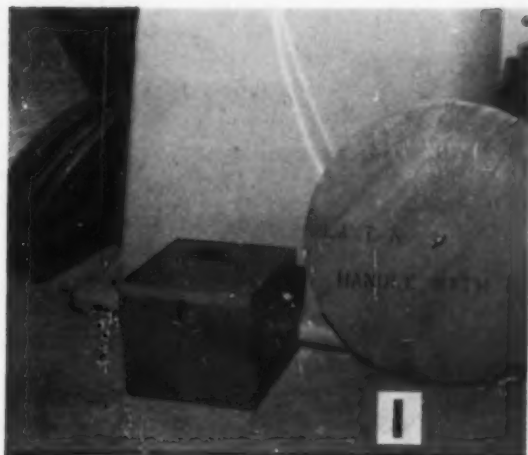
Fig. 4. Silver soldering carbide tips on a saw.

Fig. 5. Grinder made by Drexel for periphery of saw. Wheel is 180-grit diamond.

Fig. 6. Grinding side clearance on carbide tips. Wheel is 180-grit diamond. Grinder feeds in and out with an air cylinder.

Fig. 7. Moulder head with solid carbide cutters. 180-grit cupped diamond grinding wheel.

Fig. 8. Grinder contours shaper and moulder heads.



A NEW CONCEPT IN FURNACE DESIGN

for Multiple Firing of Gas, Oil and a Wide Range of Coals

When multiple fuels are to be burned in a steam generating unit, one of the problems to overcome is the variation of steam temperature with the different fuels.

Design Based on Worst Coal That Can Be Anticipated

In designing and engineering a unit in which gas, oil and coal are to be burned, the amount of furnace heating surface supplied depends upon the slagging characteristics of the coal. If the coal to be used has a minimum ash softening temperature of 2100 F., in order to avoid objectionable slagging, the unit must be designed so that the furnace exit gas temperature will be approxi-

mately 100 degrees less than the ash softening temperature, or 2000 F.

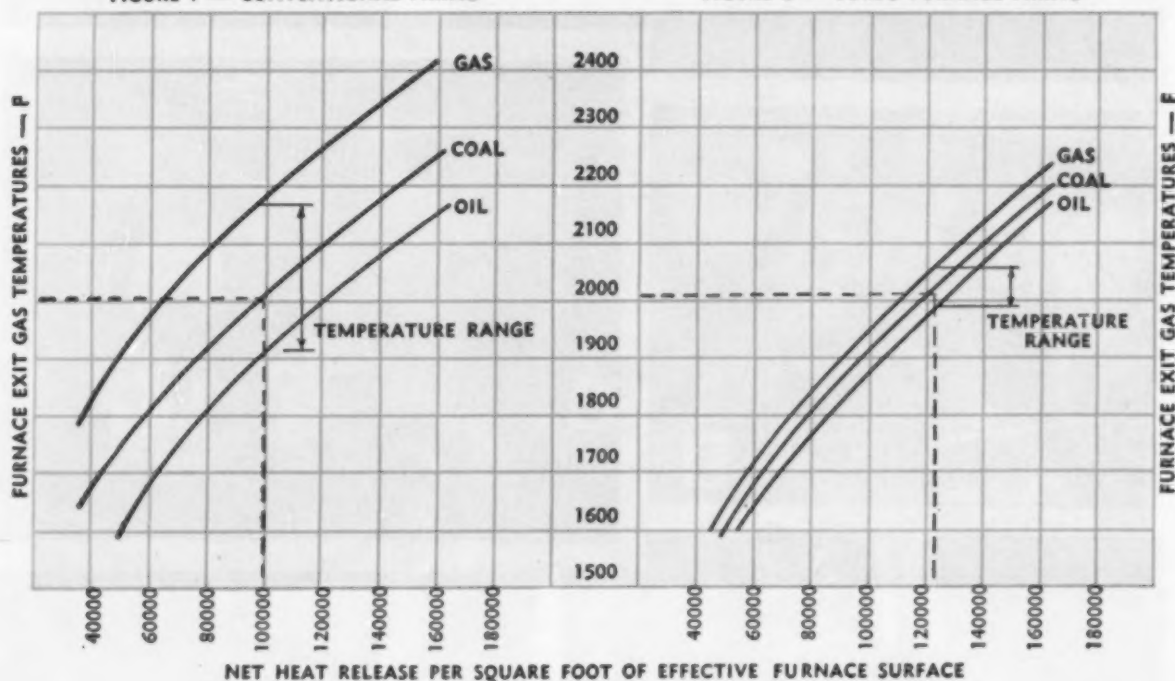
Conventional Units Need Extensive Steam Temperature Controls

When natural gas is burned in a conventional unit designed for coal with an ash softening temperature of 2100 F., the exit temperature would rise to approximately 2165 F. (Fig. 1) resulting in higher steam temperature than desired.

FURNACE TEMPERATURES

FIGURE 1 — CONVENTIONAL FIRING

FIGURE 2 — TURBO FURNACE FIRING



When oil is burned in a conventional unit burning this coal the exit temperature would drop to 1900 F. resulting in a lower steam temperature than desired. Extensive means to control steam temperature must be provided to overcome this variation in steam temperatures.

The Ideal Design for Multiple Fuels

The ideal design of a multiple fuel unit would be one which would produce the same furnace exit gas temperature regardless of the fuel burned. Figure (2) shows the exit gas temperature curves from a Riley Turbo Furnace unit. Note the material reduction in temperature variation with the different fuels. This relative similarity

in exit temperatures reduces the problem of steam temperature control to a minimum, and makes it possible to carry approximately the same constant steam temperature range with all fuels.

Uniform Furnace Exit Temperatures

Relatively uniform exit temperatures with all three fuels, when fired in a Riley Turbo Furnace unit, result from the burning of the fuels in the bottom of the unit. Combustion is substantially completed within the confines of the furnace bottom, and with this design, gas burns with a luminous flame. These operating characteristics result in a lower furnace exit temperature with a given heat release per square foot of effective radiant surface.

Overall Unit Size Reduced

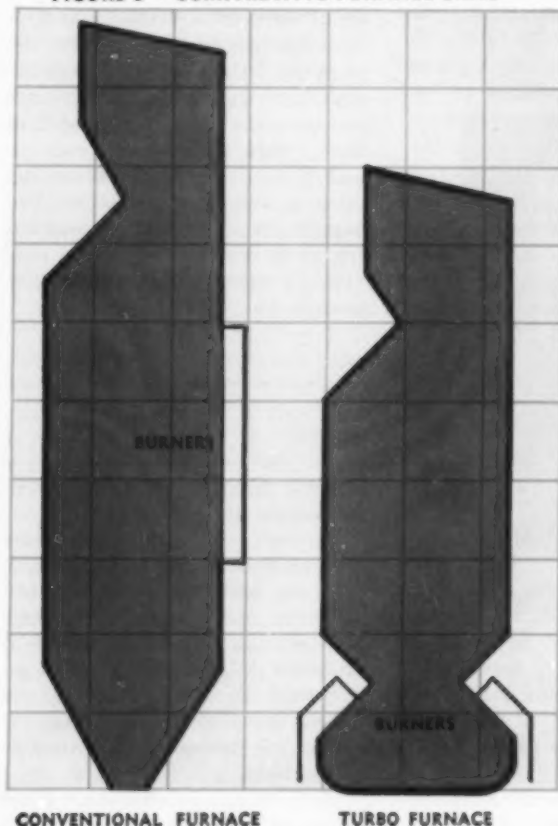
To obtain a low furnace exit temperature of 2000 F. with a conventional unit, (Fig. 1), it is necessary to design the unit with a heat release of 98,000 b.t.u. per sq. ft. of effective heating surface. With a Riley Turbo Furnace unit, to obtain this same furnace exit temperature, this furnace heat release would be 122,000 b.t.u. (Fig. 2). This results in an appreciably lower unit, see Fig. (3), another of the many advantages of the Riley Turbo Furnace.

Clean Heating Surfaces

A relatively high temperature is obtained in the Turbo Furnace bottom resulting in rapid and complete combustion. The burners, arranged for opposed firing, produce a uniform distribution of heat without the intense heat zones at the core of the flames that occur with conventional burners. There is no impingement of flame or slag on furnace walls. Heating surfaces stay clean.

A Riley engineer will gladly give you complete information about this latest Riley development. Write — Boiler Engineering; Riley Stoker Corporation, Worcester, Massachusetts.

FIGURE 3 — COMPARATIVE FURNACE SIZES

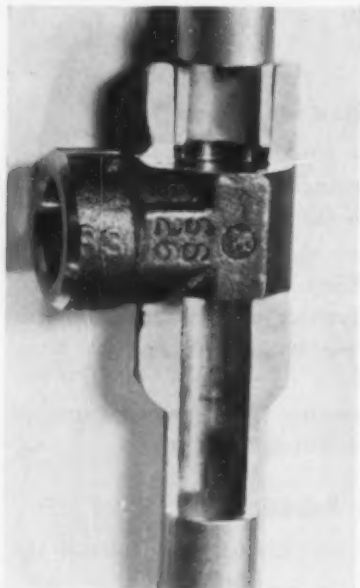


RILEY

STEAM GENERATING & FUEL BURNING EQUIPMENT

Welding Fittings for O. D. Tubing

HIGH TEMPERATURES and pressures for fluid handling systems in power plants, chemical processing installations, atomic energy plants, and other important industries, have given rise to a requirement for permanent welded tubing joints to withstand the increased stresses and strains encountered.



Weld-lok fittings for O.D. Size tubing. Cutaway view shows tube in place above before welding, and below after welding.

The Government's Tennessee Valley Authority was one of the first major plant operators to face this requirement. Their operating temperatures ranged up to 1050 degrees F, plus steam pressure in the 2000 psi range. On feedwater discharge service the pressures ranged up to 2300 psi. TVA found ordinary fittings to be a leakage source in this type of service, and finally resorted to welding to prevent the fitting's threaded joints from loosening and leaking.

The welding of standard fittings, which were not designed for weld-

ed joints, proved to be a time-consuming and expensive job. Although several welding fittings were available in pipe sizes, no comparable items for use with O.D. size tubing were known to exist. TVA decided to institute an engineering project to provide a fitting to take advantage of the important benefits offered by O.D. size tubing as compared to pipe.

A design was proposed, featuring a one piece body with tapered socket. This design could be welded with ease, the tapered socket aligning and holding the tube without need for a gripping fixture. Contact of the end of the tube with the interior wall of the tapered socket would bar entrance of extraneous material during welding. The taper would also prevent the tube from contacting the interior shoulder of the fitting, thus leaving room for the "free end" of the tube to expand with rapidly rising temperatures, eliminating possibility of expansion causing crack-

ing of the welded seam.

With production design work handled by engineers of the Tube & Hose Fittings Division of Parker Appliance Company, the new tapered socket tube fittings, labeled "Weld-lok," were made available in a range of sizes for 1/4 through 2-inch O.D. tubing — and TVA had a suitable fitting.

Weld-lok fittings are precision-machined from steel or stainless steel forgings and barstock, in all commonly used body shapes. Wall thickness of the fitting is carefully controlled to induce proper heat penetration for a uniform, correctly proportioned weld. Since no gripping fixture or other special equipment is required, the fittings can be installed in a minimum of time. They provide permanent, leak-proof joints unaffected by heat, pressure or vibration. The bore of the fittings closely matches the inside diameter of tubing, providing a smooth nonrestricted flow passage.

Centralized Lubrication System

CENTRALIZED lubrication has proven itself to be the best possible method for prolonging machine life and maintaining top operational efficiency at the Stupp Bridge and Iron Works, St. Louis, Mo.

Centralized systems, manufactured by Lincoln Eng. Co., were installed on a number of overhead traveling cranes, a battery of punch presses and numerous other metal-working machines in 1940 by Lincoln Distributor, Joseph H. Yerkes and Co., St. Louis. These machines have been in continuous operation ever since, yet

there has not been one case of bearing failure due to improper or inadequate lubrication.

Because of such outstanding performance Stupp has standardized on Lincoln Centralized Lubrication systems, equipping each new piece of machinery as it is installed at the Stupp plant. At present, all shears, punches and other heavy duty machinery at Stupp are protected by centralized systems.

E. P. Stupp, Jr., Assistant Plant Manager, has found that these systems create for Stupp "... a very worthwhile savings in time, labor and bearings replacements, plus cleaner and safer working conditions, due to the elimination of over-lubrication and accident hazards inherent in manual lubrication practice."

Modern Production Handling

MATERIAL handling techniques were carefully planned for the modern plant of Coats and Clark, Inc., Toccoa, Georgia. This is evidenced by the fleet of radio dispatched fork trucks that operate throughout the plant, power doors, power dock boards, and specially designed racks and containers. The modern plant represents the latest in design and equipment for the merchandising, bleaching, dyeing and winding of fine cotton thread.

Palletainers (product of Union Steel Products Co.) are used for a large part of the container duty. Deck size 32-in. x 48-in. O.D. and wall height of 28-in. were selected as the best common size for all uses. The 32-in. dimension was acceptable for aisles and between machines, and the 48-in. dimension combines with the 32-in. for highway truck loading.

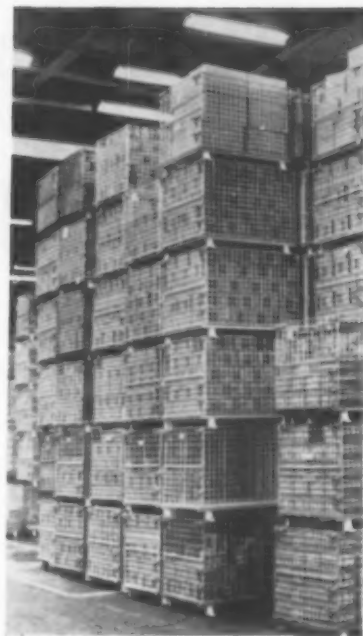
This one container size is used for cones, springs, and quiller bobbins. Net yarn contents run from 250 to 300 lb per Palletainer. A vinyl coated, snap-in canvas liner is employed as the Palletainers are used for thread in all stages of wet and dry finishing, in plant storage, and between mill shipments.

Quiller bobbins are doffed to Palletainers and go to winding. There the yarn is wound to springs, placed back in the Palletainers and moved to bleaching and/or dyeing. High poundage can be stored in a small space because the Palletainers can be stored up to five high, with load capacity up to 1,250 lb in each container.

Balling, spooling and ticketing of items for home consumption are conducted in another mill a few miles away. Yarn ready for these operations is loaded on the containers and loaded by fork truck to highway trailers and hauled to the other plant where future handling is greatly simplified.

The Coats and Clark Palletainer installation was engineered by the J. C. Wilkins Engineered Products Company of Atlanta, Georgia, representatives of Union Steel Products Company.

Typical industrial plant use of Palletainers shows how full use can be made of air-rights. Units are easily measured with any lift truck. Hinged-end access-gates permit selection without unstacking.



Air Hoist Loads Logs on Lathe

A ONE-TON air hoist is being used by the Alexander Wood

Products Company, Athens, Georgia, to load heavy logs, quickly and efficiently, onto a veneer lathe. The operator has full control of the lifting and lowering speeds of the air hoist at all times and can quickly center the log on the lathe. The one-ton air hoist, a product of the Keller Tool Division of the Gardner-Denver Company, is installed in a limited overhead space.

Mr. C. L. Bashan, Superintendent of the Alexander Wood Products Company, recognized the merits of the air hoist for this application. The compact, lightweight unit is non-sparking and incorporates an unusual number of safety features.

Atomic Trends ==

Recent Nuclear Power Progress

THE SOUTH and the rest of the nation are moving forward in the industrial utilization of nuclear energy ranging from tiny atomic batteries to large full-scale atomic power plants. New types of power reactors are being developed and are near production. Progress has been made toward the realization of the elusive fusion process for the production of electric power. New and ingenious schemes which were unheard of a few months ago are now a matter of practical speculation.

Foremost in the development of atomic energy in the South is the plan of Carolinas-Virginia Nuclear Power Associates, Inc., for the construction of a nuclear power plant in either North Carolina or Virginia.

Plant for the South

Several months ago Duke Power Company, Virginia Electric Power Company, Carolina Power and Light Company and South Carolina Electric and Gas Company joined in the formation of an atomic power partnership known as Carolinas - Virginia Nuclear Power Associates, Inc. The new organization is headed by an advisory committee, appointed by the participating companies, under Edward C. Fiss who is director of engineering.

The combine is one of six organizations cooperating in the Atomic Energy Commission's third-round nuclear power program. Five organizations participated in the first round and their power plants are either in operation or under construction. The second round includes six organizations which have until 1961 to come up with firm plans for nuclear power

By **JOHN F. LEE**

**SPI Consultant on Atomics and
Professor of Mechanical Engineering
North Carolina State College**

plants. The third round has until 1962 to complete its plans.

The Carolinas-Virginia Power Associates, Inc., has not decided on the type of nuclear power plant it will construct. However, it is almost certain to be different from any of the nuclear power plants proposed thus far. It is expected that a site will be chosen within the next four months. Since three of the four participating companies have operations in North Carolina a site in that state is receiving favorable consideration. It is quite possible the plant will be located on Duke Power Company property.

The nuclear power plant may cost between 10 and 20 million dollars and could run as high as 50 million dollars if a large plant is built. The cost of construction will be borne by the four companies with the Atomic Energy Commission supplying funds for the research, studies and some of the construction financing.

Atomic Battery

Walter Kidde Laboratories, Inc., and Elgin Watch Company announced the development of a tiny

atomic battery. The battery uses a radioactive waste by-product from nuclear reactors, promethium-147, producing energy for limitless periods of time with practically no shielding against radiation. In fact the battery gives off less radiation than the radium dials on wrist watches.

The atomic battery can be adapted to nearly all transistor circuits and will be extremely useful in such applications as small radios, hearing aids, watches and guided missiles. Commercial production is delayed by the fact that promethium-147 now costs about 500 dollars a Curie. However, when a new Atomic Energy Commission facility at Oak Ridge is completed later this year the cost is expected to drop to 50 cents a Curie.

Operation of the battery depends on the energy emitted in the form of rays or fast-moving particles from the promethium-147. These particles are then trapped in a specially converted phosphor that converts them to "atomic light" which is then captured by a photocell and automatically transformed into electricity.

Thermonuclear Power

Progress toward the utilization of the fusion or thermonuclear reaction in the production of power is cloaked in deep secrecy in

Nuclear Plant for South Carolina . . .

Since Mr. Lee wrote this nuclear power progress report, Carolinas-Virginia Nuclear Power Associates, Inc., have announced plans to construct a \$17 million nuclear plant at Parr Shoals on the Broad River about 25 miles north of Columbia, S. C. Site is adjacent to South Carolina Electric and Gas Company's Parr Shoals combination hydro-steam electric generating plant. Operating target is 1962.



CONTROL ROOM from which the Experimental Test Atomic Reactor at Arco, Idaho, is regulated. The reactor engineer is raising the reactor's control rods, so that neutron radiation from sources within the reactor can bombard the uranium metal "fuel" which surrounds the sources. The neutrons split some of the fuel atoms, thus releasing their energy and also freeing their own neutrons, which proceed to split more atoms, and so on. Meters show

how the atomic reaction is proceeding. The Leeds & Northrup electronic recording controllers on the wall record the amount of energy released, and also the neutron concentration. At the proper time, the engineer will use the Speedomax equipment to automatically control the reactor, so that it steadily yields the desired amount of energy. Freeing the engineer of reactor manipulation, the controls give him time to supervise the overall operation.

this country. However, progress has been reported by the British Atomic Energy Research Establishment at Harwell in six technical papers recently published in England. The reported progress is probably the most encouraging bit of news for those who eventually hope to tame the hydrogen bomb for peaceful uses.

It is no secret that the thermonuclear process used in the hydrogen bomb involves nuclei of deuterium (or heavy hydrogen of atomic weight 2) or a mixture of deuterium and tritium (heavy hydrogen of atomic weight 3) which undergo fusion at temperatures in excess of 100 million degree centigrade. This reaction is similar to that going on in the center of the sun. Tremendous quantities of light and heat are liberated in the thermonuclear reaction.

Now in the hydrogen bomb the 100-million degree temperature is

produced for an instant by the explosion of an ordinary atomic bomb which serves as a trigger for an uncontrolled thermonuclear reaction. Obviously, a controlled thermonuclear reaction requires the steady maintenance of a temperature of the order of 100 million degrees centigrade and it is clear that an atomic bomb is not a suitable trigger for power purposes. It is also clear that no material known to man can withstand such extremely high temperatures.

One apparent solution to the problem is the development of a non-material container. The "magnetic bottle" has been suggested by scientists in this country and abroad. It is a well known fact that a gas confined in a cylinder subjected to an electrical discharge will break down at moderate temperatures into electrons and ions. This gas, called a

"plasma" can then be subjected to electromagnetic forces acting at a distance. By feeding powerful electrical current into the gas it can be raised to any desired temperature.

Now the problem is to keep the plasma from striking the walls of the cylinder which would vaporize at such high temperatures. By applying magnetic lines of force from a distance outside the cylinder an effective barrier or "magnetic bottle" could be produced, shielding the cylinder walls from the plasma. The problem is to obtain a leak-proof "magnetic bottle" and thus far this problem has not been solved.

In two of the British papers, reports are given on the production of extremely high temperatures by discharging electrical currents in excess of one million amperes through cylinders of gas. The other four papers are concerned with the maintenance of a steady controlled thermonuclear reaction. The idea is to discharge these currents in pulses in a manner analogous to the pulsed ignition spark of a gasoline engine.

It will be recalled that the maximum temperature of the products of combustion in a gasoline engine exceeds the melting point of the cylinder head. However, since this high temperature is attained only cyclically and for a brief interval of time the materials when cooled are actually subjected to a much lower average temperature.

The British scientists propose fusing the deuterium-tritium mixture at intervals of a millionth of a second. Furthermore, they claim the possibility of producing 100 million kilowatt-hours of energy from the total fusion of one kilogram of deuterium. The fusion of one gram of deuterium per hour at a temperature of 10 million degrees centigrade would produce 100,000 kilowatts of electric power. Apparently this lower temperature is entirely feasible with the pulsed or intermittent fusion reaction.

The Department of Mechanical Engineering at North Carolina State College pioneered a year ago with the first course in nuclear power offered anywhere in the

Atomic Trends (Contd.)

world. The course is restricted to graduate students and special students who have the equivalent of a bachelor's degree in engineering or physics. All students must have prior course work in nuclear physics, heat transfer, fluid mechanics and thermodynamics.

Students in mechanical, chemical, and nuclear engineering and physicists take the course. A number of foreign countries are represented among the students enrolled in the course. The pioneer work at North Carolina State College has attracted world-wide attention. Literally hundreds of other schools and industries have sent representatives or have written to inquire about the organization of the course with a view to establishing similar courses in their own organizations.

New Type Plant

Allis-Chalmers has announced an advanced type of nuclear power

er reactor — a Controlled Recirculation Boiling Reactor (CRBR). An outstanding feature of this type of boiling water reactor is its high energy output per unit of volume. The cylindrical core, measuring five feet by five feet, will generate as much heat — 133 megawatts — as a boiler burning about 20 tons of coal per hour continuously. This is possible because of the large volume of water being recirculated continuously through the reactor.

A boiling water reactor is the power source for the 5,000 kilowatt power plant now completed and successfully operated at full power at Argonne National Laboratory near Chicago. Allis-Chalmers built all of the power generation equipment for the Argonne Experimental Boiling Water Reactor (EBWR).

The Allis-Chalmers reactor will operate at 600 psi. The heat from the nuclear reaction will boil water to produce saturated steam at a temperature of 488 F. The steam will flow through superheaters directly to the turbine. The superheaters, to be fired with conventional fuel, will increase the temperature of the steam to 1,000 F at 540 psi.

The steam turbine-generator unit will be similar to that used in the Argonne plant but with a much greater generating capacity. The slightly radioactive steam flowing through the turbine will be sealed in by special seals on the turbine shaft. The reactor vessel itself will be 9 ft in diameter and 23 ft high and be housed in a steel and concrete building approximately 45 ft in diameter by 70 ft. The steam turbine-generator unit will be housed in a conventional building.

Boiling water reactors similar to the CRBR have been proven by the Atomic Energy Commission to possess an unusually high degree of inherent safety. The presence of water within the reactor core is essential to keep the nuclear chain reaction going. Any excess heat generated by the fission process causes an increase in the amount of steam within the reactor, displacing the water and causing the reaction to slow down.



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Through a new application of an old basic principle WEBSTER now offers unequalled stability in a non-premixing ring gas burner.

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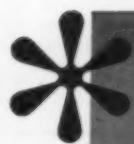
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Subject to the approval of the Atomic Energy Commission, the plant would be located on a site yet to be chosen on the system of Northern States Power Company, which company would own and operate the plant. This system was chosen because of its size and the extent of its transmission system and the company's ability



TABLES

**to help you select
the proper alloy for
your casting specs**

ALLOYED PRINCIPALLY TO MEET CORROSIVE CONDITIONS													
CHARACTERISTICS	MEET OR EXCEEDS	60	65	70	75	80	85	90	95	100	105	110	115
Weight	in. lb.	2.75	3.15	3.55	3.95	4.35	4.75	5.15	5.55	5.95	6.35	6.75	7.15
Thickness Allowed for Pattern Construction	in.	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Electrical Resistance at 75°F	ohm-in.	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Specific Heat	Btu/lb.-°F	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Thermal Conductivity at 75°F	Btu/in.-hr.-°F	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Physical Properties at Room Temperature													
Carbon %		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Tensile Strength	psi	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Yield Strength	psi	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Elongation in 2"	%	25	25	25	25	25	25	25	25	25	25	25	25
Reduction of Area in 2"	%	75	75	75	75	75	75	75	75	75	75	75	75
Impact Resistance	ft.-lb.	10	10	10	10	10	10	10	10	10	10	10	10
Average Maximum Temperature at which Material Remains in Good Condition	°F	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Strength at Elevated Temperature													
1,000°F		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
1,100°F		8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
1,200°F		6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
1,300°F		4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
1,400°F		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
1,500°F		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1,600°F		500	500	500	500	500	500	500	500	500	500	500	500
1,700°F		200	200	200	200	200	200	200	200	200	200	200	200
1,800°F		100	100	100	100	100	100	100	100	100	100	100	100
1,900°F		50	50	50	50	50	50	50	50	50	50	50	50
2,000°F		25	25	25	25	25	25	25	25	25	25	25	25
2,100°F		10	10	10	10	10	10	10	10	10	10	10	10
2,200°F		5	5	5	5	5	5	5	5	5	5	5	5
2,300°F		2	2	2	2	2	2	2	2	2	2	2	2
2,400°F		1	1	1	1	1	1	1	1	1	1	1	1
2,500°F		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2,600°F		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2,700°F		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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* from pages 6 and 7 of our new General Catalog, No. 3354-C

* from pages 6 and 7 of our new General Catalog, No. 3354-G

— and there's lots more useful information about high alloy castings in our up-to-date catalog describing Duraloy Service. SEND FOR YOUR COPY.

As one of the pioneers in both static (1922) and centrifugal (1931) high alloy castings, we have a wealth of experience to focus on your high alloy casting problem. Send for our catalog, study it, and then let us help you get the best alloying combination to solve your corrosion, high temperature and/or abrasion problem.



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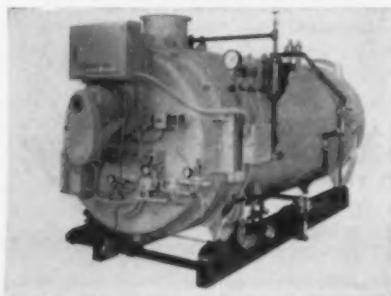
The figures you'll see may be startling. In most cases the cost analysis proves a Cleaver-Brooks costs *less*. On-job time is dras-

tically reduced because Cleaver-Brooks packaged units are fully assembled, ready to install. Cleaver-Brooks boilers give you more in performance, too... each boiler is fully fire-tested at the factory under load, tuned to peak economy. Starting service and on-the-job operator training by authorized field engineers further decreases your over-all costs.

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Once you add up all the benefits of a Cleaver-Brooks "one-cost" package... the proved trouble-free economy of exclusive four-pass, forced-draft design, you'll find it pays over and over to analyze costs carefully before you buy. See your Cleaver-Brooks agent for details or write Cleaver-Brooks Company, Dept. A, 305 East Keefe Avenue, Milwaukee 12, Wisconsin.

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Choose from 19 sizes, 130 models, 15 to 600 hp. Oil, gas and combination oil/gas fired — steam or hot, water for heating or processing.

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ORIGINATORS OF SELF-
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to meet any production delays or difficulties that may occur during preliminary tests and experimental operation. Major interconnections between companies will permit energy produced by the atomic power plant to flow into the systems of the participating companies.

King also said that his company and other utility companies located in Iowa, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin are forming a corporation for the purpose of jointly financing the research and development work associated with the construction of the plant. Negotiations are underway with Allis-Chalmers and Pioneer Service & Engineering Company of Chicago, as prime contractor and architect-engineers, respectively.

King said that plans for a controlled re-circulation boiling water reactor have been under detailed study by Allis-Chalmers and that he believes new elements in the design may make a significant contribution toward bringing the generation of electric power from atomic energy into a competitive position with conventional plants. Also, that this plant is a logical progressive step in the further development of the boiling water reactor and is the outgrowth of several years of research and development work carried on by a nuclear reactor study group comprised of many of these participating companies.

The participating companies will share in the substantial additional costs involved in construction and initial operation of this atomic plant above similar costs associated with a coal burning power plant.

Announcement of this full-scale atomic plant brings to 19 the number of atomic plants presently planned to be built in the United States at an estimated cost of \$675,000,000. Total generating capability of these plants will be nearly one and one-half million kilowatts. Three are scheduled to be in operation this year and the rest of them by 1962. More than 60 utility companies have united to build and operate 10 of these 19 plants.

Fire Protection Aid

A NEW Safety Code covering "Inspection, Maintenance and Protection of Standpipe and Inside Hose Systems" is now available without cost from the Fire Equipment Manufacturers' Association, Inc., One Gateway Center, Pittsburgh 22, Pennsylvania.

The new literature is based on the belief that a standpipe and hose system is one of the most important and effective means of fire protection within buildings.

The publisher of the Safety Code indicates the standpipe system furnishes the only reliable means of obtaining effective fire streams in the fastest time, particularly at the upper stories of multi-story buildings.

This new Safety Code reviews the various services performed by a standpipe and inside hose system. Specific guidance is provided for periodic inspection of all components in the system. Instructions for maintenance of hose, couplings, nozzles, and playpipes, are concise.

Steel Pallets Speed Loading

DEVELOPMENT of interchangeable steel pallets which fit the table of a blast cleaning machine has allowed Florida Machine & Foundry Co., Jacksonville, Fla., to absorb loading time into the machine operating cycle.

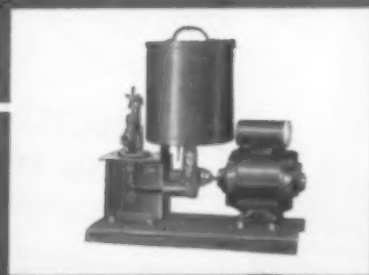
As the system has been developed, the Pangborn 8 ft LK Table-Room blasts a pallet load of castings clean while the operators are loading a second pallet and preparing it for positioning in the machine. This automatically eliminates the time operators used to spend waiting for the machine to finish a cleaning cycle so they could empty it and put in the next load.

The former cleaning method required operation 24 hours a day, 6 days a week to keep up with production. The new Pangborn LK table has cut cleaning costs in half and reduced operating time to 8 hours a day. The machine

**assures precision
metering !**

CHEMICAL FEEDERS by Manzel give accurate, dependable metering of chemicals, acids, oils, and many other liquids. Rugged, trouble-free units are available in large or small capacities, with single or multi feeds, for any type of drive. Delivery from one cc/min/feed to one gal/min/feed, against pressures to 5000 psi. Consult your Manzel field engineer for full details and recommendations.

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cleans at least 22,000 lb of castings (net weight) a day at a cost of well under a penny a pound. Table loading ranges between 2,000 and 5,000 lb with a cleaning time of 5 to 10 minutes per load.

Florida Machine and Foundry Company is a jobbing steel foundry which produces castings that vary in sizes from ¼ lb to 5,000 lb. These castings are used for sawmills, paper mills, mines, shipyards, and the rock products industry. The management of the firm feels that the improved clean-

ing job done by the new table-room has in turn improved the quality of the product. The castings are so thoroughly cleaned that any tiny imperfections are easily discovered. An important sales benefit is the fine blast finish imparted to the products, making them more saleable.

Other benefits obtained by the operation of the table-room include the fact that the company can now clean most of its castings direct from shake-out, before burning and chipping; maintenance re-



Steel pallet is an exact fit for the Pangborn blast cleaning table.

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ANNOYING SKIN
INFECTIONS
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No. 50

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quirements have been negligible; and it has been possible to eliminate 50% of the chipping. Malleabrasive is used in the machine and only 100 lb a day is added in spite of the carry-away inherent in the handling system.

Flexible Hose Increases Safety

A FIRM manufacturing automatic foghorn units for offshore drilling platforms in the Southwest has reduced field service problems by installing flexible hose lines on its products. Rigid tubing was formerly used and frequently had to be replaced due to failures caused by vibration and heat. Since the foghorns are used on stationary platforms often untended for long periods, this created a possible safety hazard.

The company switched to Aeroquip Hose and Fittings for most fluid and air-carrying applications, and has eliminated numerous field service problems. The fittings and hose can be assembled in the company's plant and can be made up from bulk stocks. In addition to regular medium and low pressure hoses, the units are equipped with a special compressor discharge hose of silicone inner tube construction. The hose resists temperatures up to 500 F, and has a long life even under the stresses characteristic of compressor discharge applications.



NEW Catalogs & Bulletins

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

2—Water Tube Boilers — Shop-assembled "package" gas-oil or combination fired units described in 8 page brochure. Pressures to 600 psig; 1,000 to 20,000 lb/hr—design features, installations. — VULCAN STEEL TANK CORP.

3—Boiler Seam Protector — Catalogue sheet describes and illustrates why H.R.T. boilers need refractory seam protection. — NATIONAL BOILER PROTECTOR CO.

4 — Steam Generators — Bulletin AX-1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability. — AMES IRON WORKS, INC.

9—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose. — NORFOLK AND WESTERN RAILWAY.

12—Steam Turbines—Advances in design of double and triple-flow tandem ratings to 250 mw, and of 3600/3600 rpm and 3600/1800 rpm close-coupled cross-compounded arrangements to 500 mw and larger, described in Catalog 03R8620. — Power Equip. Div., ALLIS-CHALMERS.

17—Unit Steam Generators — Bulletin 2000 describes units operating under a negative pressure, with induced draft fan completely purging the entire pressure vessel of any stray raw gases before and after firing. Have tube sheet protective device and precipitator for cleaner operation. — PREFERRED UTILITIES MFG. CORP.

23—Soot Blowers—Bulletin 1030 describes Vulcan T-30 retractable soot blowers, available in lengths up to 38 ft. Includes sectional drawings and special design features. — COPES-VULCAN DIVISION.

62—Firing Unit — LoStokers efficiently fire small boilers; either

firebox or brickset applications; capacity range 3,000 to 12,000 lb/hr. — DETROIT STOKER COMPANY.

76 — Gas Burner — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing — in a horizontal plane through fire doors or small openings over handfired coal grates or stokers — or for firing in a vertical plant on either side of stoker or oil burner. — THE WEBSTER ENGINEERING COMPANY.

87—Steam Turbines—Single Stage — Bulletin 500 describes features and characteristics of company's type DH steam turbines in horizontal and vertical models. — DEAN HILL PUMP COMPANY, INC.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

103—Fire Pumps—Selection charts and "typical" fire pump specifications featured in 36 p Bulletin B-1500. 120 approved pumps tabulated by Underwriters' and Factory Mutual and listed according to types of drive. — PEERLESS PUMP DIVISION.

104—Fans—Bulletins F-102 & F-200 describe Type "BL" and "BLH" fans offering high stability and efficiency for all classes of ventilation. Type "BLH" designed for high, broad efficiency curve on higher pressure jobs (6" water gauge and up). — BUFFALO FORGE COMPANY.

118—Rotary Pumps — Catalog 955, 8 pages — Describes and illustrates complete line of Roper Rotary Pump products. Sizes range from ¼ to 600 gpm for pressures up to 1000 psi. Has listing of materials of construction, performance data and dimensions. — ROPER HYDRAULICS, INC.

120 — Continuous Blow-Off Equipment — Publication No. 5700 shows how equipment can effect substantial savings in heat and fuel by returning the heat contained in the blow-off. System also maintains uniform dissolved solids concentration in boiler. Typical applications and lists of users are included. —

COCHRANE CORPORATION.

131—Rotary Pumps — Bulletin WQ-50, 8 pages — Describes Warren-Quimby Kotex pumps and gives sectional and exterior views, dimensions, engineering data, selection charts, etc. — WARREN PUMPS, INC.

132 — High Temperature Air Handling — Bulletin 702 describes Type XL Fans equipped with air cooled bearings for temperatures up to 750 F. — CLARAGE FAN COMPANY.

135—Heat Exchanger — Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to outdoor air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. — NIAGARA BLOWER COMPANY.

INSTRUMENTS—METERS CONTROLS—REGULATORS

221—Boiler Water Level Controls — Catalog describes exclusive magnetic operating principle. Low water cut-offs (single stage); pump controls; low and high water alarms; and water columns. Complete line 0-900 lb wsp. — MAGNETROL INC.

223—Combustion Control—Bulletin 1023, 24 pages—Contains actual installation photos and diagrammatics of Bailey air operated combustion control for oil and gas fired boilers; two pages of chart records and six page list of typical installations. — BAILEY METER COMPANY.

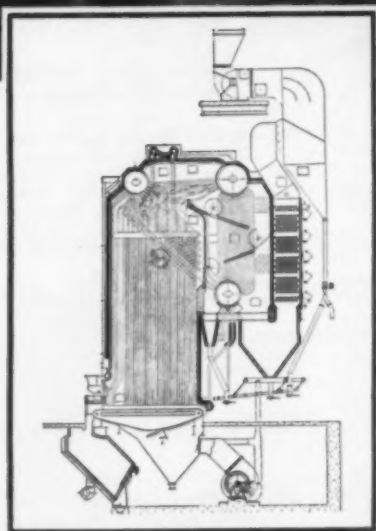
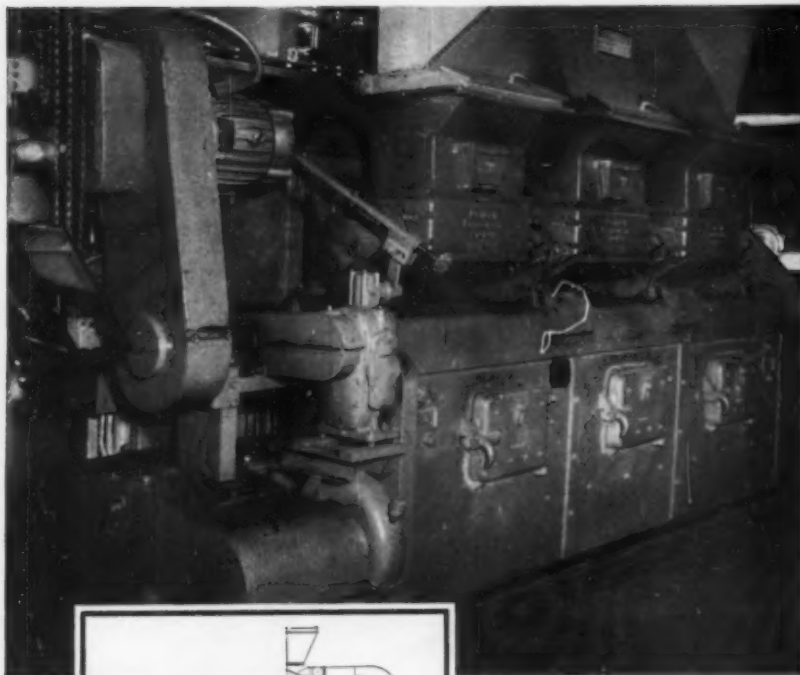
225—Cooling Controls — Self-powered controls for compressors, stills, solvent coolers, degreasers, small engines etc., described in Bulletin 710; operational and hook-up sketches. — SARCO COMPANY INC.

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"It operates 24 hours a day—5 to 6 days a week, 60,000 to 90,000 pounds of steam per hour.

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248—Pump Pressure Regulators —
Bulletin 5306 describes constant and differential pump pressure regulators for steam turbines, reciprocating and motor driven pumps. Complete sizing and capacity information as well as construction features. — **LESLIE CO.**

254—Pilot Pressure Controller —
Bulletin D-4 — Describes the dependable Wizard pilot, Series 4100U, in a new gas type weather-proof case for flush or surface panel mounting, available with either bellows or Bourdon tube measuring elements for pressures from inches of water to 10,000 psi. — **FISHER GOVERNOR CO.**

280 — Valve Manifolds — Bulletin 56-1 explains how the new Equi-Safe manifolds stop mercury blowing and damage to differential bellows and diaphragms. Gives excellent protection to differential pressure type instruments. Can be completely dismantled without breaking any pipe connections and inlet seat can be dressed up in place. — **REPUBLIC FLOW METERS CO.**

291—Pneumatic Loading Stations—
New line of auto-manual units

of non-seal type described in Bulletin 1031. Applicable to combustion control, feedwater regulation, pressure-reduction systems, desuperheating stations in steam power plants. — **COPES-VULCAN DIVISION.**

297—Remote Signal Alarms—Bulletin WG-1824 describes how lights on horns, operated by indicator control unit give instant warning of any serious deviation from normal boiler water level. — **YARNALL-WARING COMPANY.**

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

301 — Metal Fabrication — Replacement parts for plant maintenance; Sheet, plate & light structur-

al. Brochure describes engineering services for Southern industry. — **ENGINEERING SALES.**

309—Elevated Steel Tanks — 16 p "Tank Talks" shows various types of tanks constructed and erected by manufacturer as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, etc. — **R. D. COLE MANUFACTURING COMPANY.**

312—Low Temperature Welding —
Wall chart TIS 2616 lists torch and arc welding applications for all metal-working jobs. Enables the welder to adopt the best alloys and procedures for repairs. Helps stock clerks and purchasing agents concerned with welding alloy selection. — **EUTECTIC WELDING ALLOYS CORPORATION.**

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JANUARY, 1958

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315—Pressure Vessels — Catalog 100 discusses your plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks, etc. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given. — J. J. FINNIGAN CO.

319—Portable Band Saw—Bulletin describes the Kalamobile, a portable metal-cutting band saw. Has rubber-tired 12" wheels and telescoping handles. Capacity 6" rounds - 10" flat. — Machine Tool Div., KALAMAZOO TANK AND SILO CO.

336—Retaining Walls—Catalog RW 3555 shows how bin-type walls

stabilize slopes and gain valuable ground for buildings, parking areas; all metal cellular construction; all-bolted assembly means small crews can do the job.—ARMCO DRAINAGE & METAL PRODUCTS, INC.

340—Gas Fired Infra-Red Heaters—Bulletin PB 1-56 describes design and application of Panelbloc industrial - commercial infra - red heater. Requires no fan, blower or electrical connection. — THERMO-BLOC DIV., PRAT-DANIEL CORP.

344—Air Compressor—8 p brochure illustrates and describes the Channel-Flo Compressor, a 2-stage, 200 psig rated motorcompressor available in 1½ and 2 hp sizes. Flange-mounted directly on driving motor.—INGERSOLL-RAND CO.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. —THE WM. POWELL COMPANY.

417—Welding Fittings — 192 page Cat. 54 gives design data on piping and piping application including digests of specifications, working pressures, design formulas, etc. Covers welding fittings, prefabricated pipe, forged steel flanges, and pipe coils. — MIDWEST PIPING COMPANY, INC.

418—Diaphragm Control Valves — Complete facts on company's ¼" to 6" valve line given in Bulletin CV53. Design features large flow coefficient.—KEILEY & MUELLER, INC.

426—Pressure Regulating Valves—Standard line of regulating valves for steam, water and air service described in Cat. 77. Complete specification data. — MASON-NEILAN DIV.

429—Expansion Joints — 8 p Bulletin EJ-1915 describes Type W Gun-Pakt expansion joint which features an improved one-piece design of body and gland. Includes data on figuring expansion of pipe lines and suggestions for installing expansion joints. — YARNALL-WARING CO.

440—Jacketing "Check-Charts" — To help you estimate your aluminum jacketing requirements, manufacturer offers easy-to-use "Quick Check Charts" for .006, .016 and .020 jacketing. — ASECO, INC.

443—PVC Fittings & Flanges—Corrosion resistant polyvinyl chlo-

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ride pipe fittings & flanges covered in 12 p catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc.—GRINNELL COMPANY, INC.

446—Valve Performance Facts—32 case histories covering valve installations throughout industry.—CRANE CO.

456—High Alloy Castings & Pipe—Bulletin 3354G explains how static and centrifugal casting & pipe offer maximum resistance to heat and corrosion.—THE DURALOY COMPANY.

467—Valve Selecting Guide—Revised edition of Circular 555 (A.I.A. File No. 34) gives tables, technical data and general information on selection of valves, boiler mountings and lubricating devices.—THE LUNKENHEIMER CO.

MAINTENANCE PACKING GASKETS, LUBRICATION

502—Hazardous Liquid Gasket Material—How type 662 gaskets can stand varying climatic conditions without drying, shrinking, or hardening described in Bulletin AD-146. For use against gasoline, water and oil at temperatures up to 300 F. Has Underwriters' Laboratories, Inc. approval.—THE GARLOCK PACKING COMPANY.

505—Metal Cutters—Bulletin 655 shows actual cost figures on various metal cutting jobs (bolt, rod, wire, chain, etc.) by using cutters, hand and power-operated cutters.—H. K. PORTER INC.

507—Power Sweepers—Folder describes the "704," a compact unit for small plant budgets; designed for congested areas and narrow aisles; gasoline, LP gas or battery powered.—WAYNE MANUFACTURING COMPANY.

509—Rust Solvent—Data sheet describes "Liquid Wrench" a penetrating rust solvent that loosens rusted bolts, nuts, screws and "frozen" parts. Safe for all metals and alloys.—RADIATOR SPECIALTY CO.

510—Hard Surfacing—20 page digest TIS 2821 discusses wear and need for overlays for abrasion, corrosion, friction, heat and impact; case studies; check list of 15 characteristics overlay deposits should exhibit.—EUTECTIC WELDING ALLOYS CORP.

529—Valve Maintenance—Folder describes the Dexter power-driven, one-man operated valve-in-line reseater. Average grinding time

4 min. Grinding heads for all angles; sizes ¼" thru 12"—THE LEAVITT MACHINE COMPANY.

545—Correct Lubrication—"Lubriplate Data Book" shows importance of providing and maintaining proper and economical maintenance of all types of plant machinery thru adequate lubrication.—FISKE BROTHERS REFINING CO.

552—Packing Removal Tool—Bulletin DHSP describes the Dura Hook that "works around corners" for removing old packing from stuffing boxes.—DURAMETALLIC CORPORATION.

584—Zinc Coatings—Bulletin describes Galvanox, a special zinc coating applied as a paint to provide galvanic protection to metals.—SUBOX, INC.

590—Steam Line Treatment—Folder describes alkaline IPCO S-L-T. Used in boiler water it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings.—INDUSTRIAL PRODUCTS CO.

KEEP UP-TO-DATE USE SPI READER SERVICE

596—Tube Cleaners & Expanders—Catalog 77 covers tubes in high pressure boilers, superheaters, economizers and other heat exchange equipment. Model 38 expander rolls and flares in single operation.—THOMAS C. WILSON, INC.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

624—Freight Elevators—Booklet A-414 describes the new Plunger Electric Freight Elevator designed for low-rise, light and heavy duty freight handling requirements.—OTIS ELEVATOR COMPANY.

629—Longer V-Belt Life—12 page Bulletin 20x6234C describes various types of V-belts and tells how to select and match them. Lists seven steps for correct installation and hints for making them last longer.—ALLIS - CHALMERS MFG. CO.

656—Speed Reduction—Bulletin 191 outlines three styles of speed reduction—integral gear motors, speed reducers with separate motors, and speed reducers

alone. Highlights all the important engineering advantages of Sterling drives and contains important information for consideration when selecting speed reducers.—STERLING ELECTRIC MOTORS, INC.

669—Universal Joints—Bulletin 820 describes joints with ¼" to 2" bores; ¼" to 4" hub diameters; 340 to 130,700 in-lbs static torque; and ½ to 2-7 hp (100 rpm).—LOVEJOY FLEXIBLE COUPLING CO.

691—Tug-Bar—Data sheet describes low-cost answer to load-handling in cramped areas. Weighs only 110 lb; handles loads up to 4,000 lb; motor driven wheels do the work.—WESTERN GEAR CORPORATION.

696—Belt Manlifts—Catalog 5A-156 describes 3 sizes of belt-type manlifts for simultaneous traffic in both directions for plant personnel. Comply with A.S.S. Code requirements.—J. B. EHRSAM & SONS MFG. CO.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

701—Exhausting Corrosive Fumes—Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans.—CLARAGE FAN CO.

705—Test Your Tower—Bulletin offers simple, proved method by which you can determine how closely your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water.—THE MARLEY COMPANY.

706—Automatic Roof Cooling—Bulletin shows how automatic evaporative roof cooling can reduce inside temperature 8 to 15° without air conditioning; increase roof life; and reduce fire hazards. Many Southern installations.—APRIL SHOWERS—SOUTHERN.

722—Packaged De-Ionizers—Bulletin PK describes complete line of de-ionizers, which produce chemically pure water at flow rates up to 1000 gph. Standardized units, shipped from factory fully-assembled, eliminating complicated installation problems, and virtually eliminating service problems. Recommended for laboratory and plant production uses.—ILLINOIS WATER TREATMENT COMPANY.

735—Refrigerating Machine—Bulletin 1426 describes the Tonrac single-stage hermetic centrifugal refrigerating machine, which maintains constant chilled-water temper-



measured quantities
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CHROMALOX Electric CIRCULATION HEATERS

Used for preheating oil—heating water—generating, superheating and drying steam—heating process kettles and tanks—heating Dowtherm, Arcolor, Prestone and similar heat transfer liquids—heating air, nitrogen and other gases.

Easy to install, operate and maintain, these compact, packaged heating units are automatic and self-contained—with built-in heating elements, heating chamber, thermostat, and insulation. Provide dependable round-the-clock operation. Ideal for converting steam or gas-heated equipment to automatic electric operation.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically.

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of Bulletin 701

... to get complete information on Chromalox electric heat exchangers and their applications.

For information on complete line of Chromalox electric heaters and controls—request Catalog 50.

Edwin L. Wiegand Company

7563 Thomas Boulevard, Pittsburgh 8, Pennsylvania

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New Catalogs & Bulletins (Contd.)

ature regardless of load. Single level construction simplifies installation.—AMERICAN BLOWER CORPORATION.

745—Dust & Fume Control — 40 p booklet gives helpful information on recovering dusts, fly ash, mists, fumes and other suspensions of gases. Summarizes important points design and plant engineers should know about electrical precipitators.—WESTERN PRECIPITATION CORPORATION.

764—Cooling Equipment — Bulletin 80-D describes company's complete line of commercial and industrial equipment—operating principles, design features, etc.—FRICK CO.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

802—Small Relays—Simple solenoid design with only one moving part described in Bulletin 700. Silver alloy contacts need no cleaning, filing, or other maintenance. — ALLEN-BRADLEY CO.

803—Shielded Electrification—Bulletin KS-1 describes "Kant Shock" for monorail and crane systems. Shielding prevents accidental contact with live bus bars. Eliminates all hazards of open bar conductors, prevents costly accidents, protects employees and reduces insurance rates. — AMERICAN MONORAIL CO.

805—Power Factor Correction — 24 page catalog 50B shows how you can cut power costs by installing correction capacitors on motors and other inductive electrical equipment.

Greater loads can be handled from existing circuits. Wiring, transformer and switchgear costs can be greatly minimized in new installations.—SPRAGUE ELECTRIC CO.

821—Electric Strip Heaters—Bulletin F1566 shows how to quickly and easily bolt or clamp Chromalox strip heaters to platens, dies, kettles, tanks, etc., for advantages obtained with electric heat.—EDWIN L. WIEGAND COMPANY.

838—Electric Motors—12 p brochure gives motor applications and factors in standard motor selection. Company's complete standard motor line described. — STERLING ELECTRIC MOTORS, INC.

852—Autotransformer Starter—with air break contacts up to 75 hp, 220 v; 150 hp, 440-550 v is described in Bulletin 646. Silver alloy contacts stay in good condition without filing, cleaning or dressing. — ALLEN-BRADLEY.

859—FHP Motors — 16 p Bulletin GEA-6424 illustrates design advantages and shows components in integrated insulation system of general purpose fractional hp motors. Used on power tools, heating and ventilating equipment, compressors, fans, water pumps, and machine tools. — GENERAL ELECTRIC CO.

874—High-Voltage Cable — Bulletin EB-27 gives full details on performance of Type AB insulation in 15 Industry Specification Tests, including operating temperature. — ANACONDA WIRE & CABLE COMPANY.

879—Commutator Maintenance—27 page booklet B-6150-A contains information on brush and commutator maintenance. Includes maintenance requirements, factors affecting commutation and carbon brush materials. — WESTINGHOUSE ELECTRIC CORP.

Engineers' Books

Glossary of Terms in Nuclear Science & Technology

Published by **The American Society of Mechanical Engineers**, 29 West 39th St., New York 18, New York; 188 pages; Price, \$5.00.

The glossary terms and definitions of this book are prepared in nine sections: physics, reactor theory, re-

actor engineering, chemistry, chemical engineering, biophysics and radiobiology, instrumentation, isotopes separation, and metallurgy.

Generally, it aims to limit the inclusion of terms in each section to the categories peculiar to the field of nuclear energy, used in this field in a different sense or with different emphasis from what is commonly understood in other connections, and used elsewhere in the same way but so infrequently as to be unfamiliar.

Elementary Thermodynamics

By Virgil Moring Faies, Prof. of Mechanical Engineering, North Carolina State College; Published by The Macmillan Co., 60 Fifth Avenue, New York 11, N. Y.; 331 pages; Price, \$6.75.

This book, extracted from the author's *Thermodynamics*, offers a short, theoretical course. Explanations are shortened but are as complete and clear as in the full length work. Most of the basic theory is covered at the outset, and there is a clearer indication of which principles and methods apply to gases and which to vapors.

FUTURE EVENTS of Engineering Interest

Jan. 27-30: 9th Plant Maintenance & Engineering Conference, International Amphitheatre and Palmer House, Chicago, Ill. 25 sessions with 66 speakers and 425 exhibiting companies. Clapp & Poliak, Inc., New York, New York.

Jan. 31: Oklahoma Regional Meeting, Natural Gasoline Association of America, Skirvin Hotel, Oklahoma City, Okla. William F. Lowe, Secy., Natural Gasoline Assoc. of America, 421 Kennedy Bldg., Tulsa 3, Okla.

March 17-19: American Power Conference, Chicago, Ill. R. A. Budenholzer, Director, Am. Power Conf., Illinois Institute of Technology, Chicago 16, Ill.

March 17-21: 4th Nuclear Engineering & Science Conference & Exposition, Chicago, Ill. For information write Atomic Exposition, 117 South 17th St., Philadelphia 3, Pa.

April 16-18: Natural Gasoline Assoc. of America, Annual Convention, Baker and Adolphus Hotels, Dallas, Texas.

May 1-8: 26th Annual Meeting, American Society of Tool Engineers, Philadelphia Convention Center, Philadelphia, Pa. Richard Gebers, Public Relations Mgr., ASTE, 10700 Puritan, Detroit 38, Michigan.

May 12-16: Southwestern Metal Exposition, State Fair Park, Dallas, Texas. W. H. Eisenman, Mgr. Dir., 7301 Euclid Ave., Cleveland 3, Ohio.

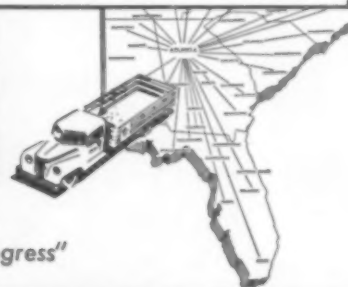


In the photo above, made in the loading dock of our Warehouse Division, you'll see written in chalk on the lift "Go man, go!" It was put there by one of the workers. We think it typifies the spirit that moves steel and aluminum so rapidly from our warehouse to you.

The minute your order hits our order desk, it's on the way to being filled. Usually delivery is made anywhere in the Southeast within 24 hours—by our own fast fleet of trucks or by reliable common carriers.

With service like this—and ample stocks of a wide range of steel and aluminum warehouse products—no wonder it will pay you to call—

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—ON THAT
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METAL-CUTTING
PROBLEM!

USE



If it's a "hard-to-figure-how" metal-cutting job, — there is a PORTER CUTTER that can handle it for you, with amazing speed, and lowest possible cost. In the versatile PORTER line there are 100 different hand-powered cutters, each one designed to do a particular job, or jobs — to cut some type or size or shape of metal fast and cheap, including BOLTS, RODS, SCREWS, RIVETS, WIRE, CHAIN, SOFT, MEDIUM AND HARD METALS, STEEL STRAPPING, and many others. These rugged cutters exert up to 20,000 pounds cutting pressure — make hard work easy, cut labor costs as much as 97%! Want profitable proof? Write for the PORTER catalog.

Illustrated above — is the famous PORTER CENTER-CUT CUTTER. The leading all-round cutter for industrial production. 8 sizes — up to 3/4" capacity.

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The PORTER
WORK-STATION
CUTTER

— In 3 sizes — can increase the output of one man up to 300% in continuous volume cutting, up to 1/2" capacity.

for THOSE RUGGED JOBS!

PORTER HEAVY DUTY CUTTER

Cuts almost anything in metal — up to 3/4" diameter — thanks to its heat-treated, heavy-forged straps, and hard-tempered, center-cut jaws. Available in 3 sizes.

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It should show you the way to the solution of your metal-cutting problem.

Contact your Industrial Distributor for Service

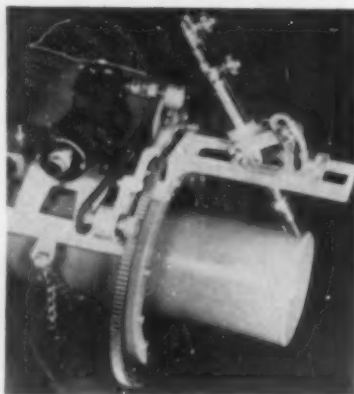
H. K. PORTER, Inc.

Somerville 43, Mass.



NEW Products

Briefs



Motorized Unit for Pipe Cutting & Beveling

A-1 The H&M Pipe Beveling Machine Company, 311 E. 3rd St., Tulsa, Oklahoma, manufacturers of H&M pipe cutting and beveling machines, are now making a motorized machine which provides completely automatic operation in cutting and beveling on pipe, ranging in size from 1 1/2" to 36". This unit can be attached to any one of H&M's seven standard machines.

The Motorized Unit attachment is powered by a fractional horse-power a-c/d-c motor. Switching from manual to automatic or vice-versa, is made easy by the quickly detachable mounting bracket. A flexible coupling is used to connect the motor with the crank pinion, which drives the main gear and the cutting torch around the pipe.

The operation of the Motorized Unit is accomplished by setting the governor-controlled motor to the required speed that will assure a smooth, clean cut, lighting the cutting torch, and turning the switch to the direction of travel that is desired.

The H&M Motorized Unit can be used in a wide variety of operations, from "one-man" shops to assembly line factories, wherever automatic pipe cutting and beveling is desired.

The H&M Motorized Unit can be used in a wide variety of operations, from "one-man" shops to assembly line factories, wherever automatic pipe cutting and beveling is desired.

Coal Scale Alarm

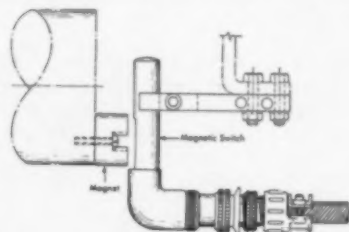
A-2 Automatic protection against coal supply failure in pulverizer or stoker-fired operations is provided by a new warning device developed by **Richardson Scale Co.**, Clifton, N. J.

Known as "Coal-Alarm," the new system is tied in with the stoker or pulverizer feeder shaft, and will sound a warning when coal supply runs low or arches.

Heart of the system is a magnetic switch which receives impulses from a magnet mounted on the pulverizer or stoker shaft. This transmits electrical impulses to an electric stop counter which automatically registers each revolution of the feeder. The setting for alarm purposes is based on the feeding capacity per revolution of the feeder.

Normally, a full supply of coal is

maintained ahead of the boiler, and a definite number of shaft revolutions of feeder or stoker will feed a ton of coal. For a 500 lb scale therefore, 4 discharges will be required to maintain the coal supply. The electric counter, with pointer setting, is thus set for the number of revolutions necessary to deliver 500 lbs.



As the scale discharges its load, the counter resets itself to zero. But if for any reason the preset number is reached or exceeded before the scale

discharges another load, an alarm is immediately sounded and the operator has time to investigate and correct any unusual condition before losing the fire in the boiler.

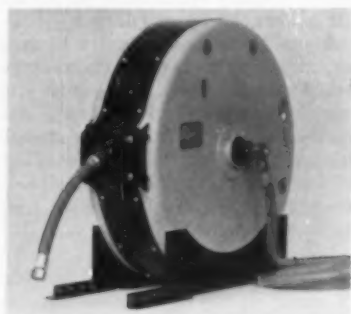
As noted, the signal is dependent only on fuel consumption, not on time, so that the alarm signal is always "in step" with boiler load, despite fluctuations in demand or production of steam.

Dust and dirt will not in any way affect the electrical connection of the Coal Alarm.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 73

Hose and Cable Reel

A-3 **United Specialties, Inc.**, Box 698, El Dorado, Arkansas has announced a new addition to their Weldreel line of industrial hose and cable reels. It is the Model A-2 unit with a capacity of 50 feet of $\frac{1}{2}$ " I. D. single hose.



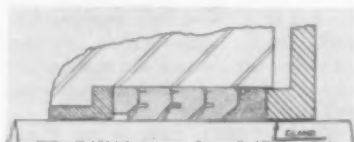
Designed for use with compressed air, industrial gases, liquids and chemicals, the unit features the universal type mounting bracket which permits easy installation on wall, floor, ceiling or mobile equipment.

Heavy duty clock-type spring provides automatic retraction into metal housing when hose is not in use. Teflon seals assure leak proof operation at all normal operating pressures. Hose is locked at any desired length by position action pawl and is released by means of a slight tug on hose.

Pump Packing

A-4 A new pump-packing design, the UTEX-J, manufactured by **Universal Packing & Gasket Company**, 5200 Clinton Dr., Houston 20, is said to

increase the life of rods and packing in many services. It also has wide application to hydraulic equipment and at present is being tested for polish rod applications.



Incorporating a flexible lip, a non-crushable construction and an OD that will seal in worn boxes, the same basic "J" design is made up in a variety of formulations.

Style No. 740 Fluid Piston Rod Packing for duplex piston-type slush pumps is reported to reduce rod wear by 25%, using only three seal rings to the rod. The material has a definite "stop" to indicate full compression, yet may be over-compressed to give satisfactory results on rods as much as $1/16$ " undersize.

Style No. 742, designed for plunger-type pumps handling oil, acidizing solutions and similar liquids, also uses only three pressure rings with thermosetting phenolic adapters and bearing rings to support the plunger and packing.

Style No. 835, non-crushable, non-adjustable packing for plunger-type pumps handling fresh and salt water, oil, propane, butane, naphtha and other chemicals, employs pressure rings, thermosetting phenolic top and bottom adapters and bearing rings where needed. Pressure ranges up to 14,000 psi in these applications.

Plastic Pipe for Process Industries

A-5 **The A. M. Byers Company**, Clark Bldg., Pittsburgh, Pa., is now producing PVC plastic pipe (polyvinyl chloride) for chemicals, food processing, petroleum products, pulp and paper processes, mining and other process industries.

Two types of PVC pipe are being produced: Type I — a pure PVC that is particularly adapted to chemical and related applications, and Type II — a similar product modified with rubber to give it high impact and better service in mechanically punishing applications.

Both types are available in three wall thicknesses — standard weight, heavy, and extra heavy in sizes $\frac{1}{4}$ " thru 6".

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Ask your supplier about EVANS
Steel Measuring Tapes

Evans RULE CO.
Elizabeth, N. J. • Montreal, Quebec

New Product Briefs (Continued)



Valve Stem Packing

A-6 The Garlock Packing Company of Palmyra, New York has recently introduced a virtually universal valve stem packing for medium tempera-

ture service. The new packing material, designated Style 5022, is a molded type valve stem packing ring made from copper wire inserted asbestos yarns which are braided and impregnated with Teflon suspensoid and die formed into rings.

Heart of Style 5022 is the Teflon which gives the packing unique characteristics and extreme versatility. Style 5022 has mechanical strength and extreme toughness. It is dense and firm, does not allow seepage and can withstand a great deal of physical abuse. Teflon acts as lubricant thereby eliminating graphite or liquid lubricant that tends to dry out, burn out or exude. It is serviceable at temperatures up to 500 F and exhibits low flow under high pressure. There is no known solvent for Teflon. It is unaffected by all known chemical agents, excepting molten alkali metals. Style 5022 can be employed where equipment is operating in contact with corrosive materials or under corrosive atmospheric conditions. And it will not debase or discolor the product handled.

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TO COOL A FLUID...
and have a problem
of water supply or
disposal... use
NIAGARA "AERO"
HEAT EXCHANGER**



► Evaporating a very small amount of water in an air stream you can cool liquids, gases or vapors with atmospheric air, removing heat at the rate of input, controlling temperature precisely. Save 95% of the cost of cooling water; save piping, pumping and power. You quickly recover your equipment cost.

You can cool and hold accurately the temperature of all fluids, condense

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You may apply this to solvent recovery, vacuum systems controlling reactions, condensing distillates, cooling reflux products.

For more information, write for Bulletins 120, 124, 135. Address Dept. SP-1.

NIAGARA BLOWER COMPANY

Dept. SP-1, 405 Lexington Ave., New York 17, N. Y.

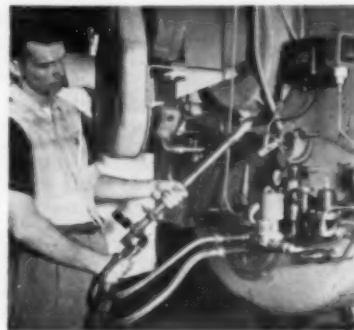
Niagara District Engineers in Principal Cities of U. S. and Canada

Burner Nozzle Cleaning Simplified

A-7

Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wisconsin has incorporated

a single tip retractable nozzle on its model CB boilers that simplifies cleaning of the burner nozzle. Flexible lines allow the nozzle to be inspected without removing any bolts.



The single tip nozzle offers more stable combustion and more positive mixing action of oil and air. The nozzle is fully retractable on model CB boilers, 60 hp and larger.

A small vise conveniently located on boiler head is used to remove nozzle tip quickly and easily. On combination oil-gas fired models, the nozzle can be withdrawn from gas firing position to bring the nozzle out of the radiant heat zone. This prevents vaporization of oil which may still remain within the nozzle.

Cleaver-Brooks produces a complete line of boilers in 130 models, 19 sizes, 15-600 hp, 15-250 psi for heating and processing operations.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 73

Tramp Iron Removal From Slurries

A-8

Eriez Manufacturing Company, Erie 6, Pa., has announced development of a

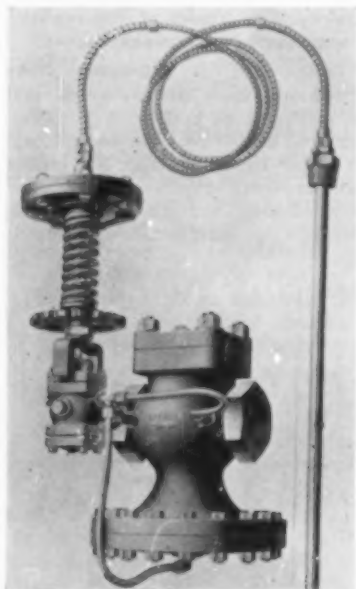
permanent magnetic drum for automatic separation of tramp iron in slurries, incorporating features which successfully overcome the hazard of bearing failures due to the action of liquids and abrasives in the slurry.

The Eriez drum comprises a revolving cylindrical shell enclosing a bank of stationary Alnico V permanent magnetic castings occupying slightly more than 180 degrees of the drum circumference. In operation, the drum is installed in a

chute so designed as to direct the flow of slurry into the drum's powerful magnetic field. Any tramp iron is forced to adhere to the revolving shell until carried out of the magnetic field, when it drops into a tray.

A scraper bar assists in removal of ferrous accumulations, while a waterspray near the top of the drum eliminates carry-over of slurry and abrasive material.

Important from a maintenance standpoint is the entirely new approach to bearing protection. An epoxy resin seal has been developed for the joints between the drum shell and the end flanges, and between the drive extension and the end flange. As a further essential precaution, the end flange on the stationary shaft has been designed as an extension which, with its internal bearing, projects completely beyond the side of the slurry chute through an opening sealed with a neoprene gasket. These measures have proved wholly effective in securing the drum's bearings against the potentially harmful action of slurry liquids and abrasives.



Temperature Regulator

A new temperature regulator offered by **Spence Engineering Company, Inc.**, Walden, N. Y., consists of the Spence type E main valve controlled by the new T14 pilot. The T14 pilot is recommended for slow-heating units such as storage heaters for oil and water, plating tanks, kilns and ovens.

When the volume of heated fluid

is large compared to the rate of steam supply, a simple, temperature-actuated pilot produces close regulation. The type T14 pilot automatically opens and closes the main valve as required to maintain a constant temperature. Type ET14 regulator applies line pressure to the heating equipment. If the equipment is rated for less than line pressure, a pressure reducing pilot (type D) to limit steam pressure to a predetermined maximum can easily be connected to the T14 pilot.

Spence pilots are interchangeable on any Spence main valve. The new pilot will fit any existing Spence main valve now in use.

Purge Sequence Valve

Announcement has been made by **Atlas Valve Company**, 280 South Street, Newark, N. J., of a purge sequence valve which provides a secure and hazard-free means of steam purging or scouring oil burner tips in industrial installations.

Designated Fig. 1000, the device is



a triple interlocked valve system actuated by a single handwheel. It dictates an inflexible and irreversible sequence in the control of (1) atomizing steam, (2) fuel oil, and (3) steam for purging the burner tips. The cycle positively prevents the admission of oil to a hot firebox before the admission of atomizing steam, eliminating possible human error and possible boiler explosion in the manipulation of three separate valves usually required in this type of installation.

REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER

With free air the cooling medium, you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This air-cooled condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often profit by recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact, easily maintained unit replacing both cooling tower and barometric or surface type condenser.



Niagara Aero Vapor Condenser Panel Casing construction gives access to all parts, saves first costs in shipping and installation.

Maintenance expense is low. Niagara Aero Vapor Condenser Panel Casing construction gives access to all parts, saves first costs in shipping and installation. Summer-winter dampers and Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

Constant temperature, uniform products and maximum production 12 months a year are assured. Capacities up to 15 million BTU/hr.

Write for full information. Ask for Bulletin 129R

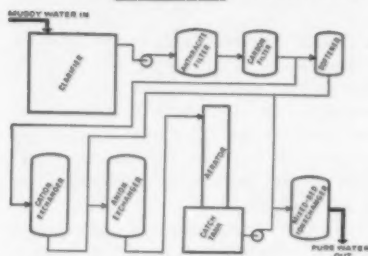
NIAGARA BLOWER COMPANY

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Niagara District Engineers in Principal Cities of U. S. and Canada



HIGH-PRESSURE BOILERS NEED PUREST WATER



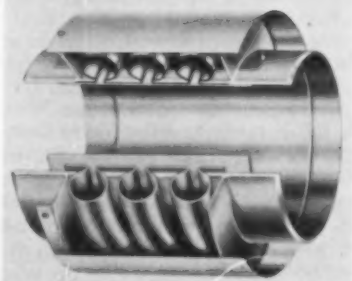
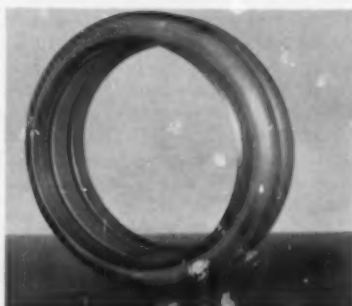
An ILLCO-WAY System, incorporating up-to-date ionXchange equipment, offers the best opportunity available today for obtaining the high-purity water that modern high-pressure boilers *must* have to avoid serious loss of operating efficiency. Such a System will take the muddiest kind of hard river water and clean it up so that suspended impurities, mineral content, and dissolved solids are reduced to almost unmeasurable quantities. The result — top boiler performance, always, and top turbine performance.

ONE SOURCE FOR THE WHOLE SYSTEM

Today, such a System can be obtained, *complete*, from a single source — Illinois Water Treatment Company. We design and manufacture every element to solve successfully the particular application. You do not need to combine a part from here and a portion from there — you get it *all* from us, all tanks, all piping, all valves and controls, all resins and other materials, all carefully selected to suit *your* needs. Consult our experienced engineers at the next opportunity . . .



New Product Briefs (Continued)



Toroidal Expansion Joints

A new line of expansion joints for high pressure and high temperature service, embodying a patented toroidal corrugation design, is available from Zallea Brothers, 815 Locust St., Wilmington, Del.

Known as Zallea HyPTor expansion joints, these units protect power and process piping systems and re-

lated equipment against damage from expansion and contraction due to temperature change.

Toroidal corrugations have circular or oval cross-sections which, for any given pressure, produce operating stresses lower than any other corrugation shape.

Because each toroidal corrugation is somewhat like a closed coil of thin-walled "tubing," stresses depend primarily upon the "tubing" radius and wall thickness, and are almost entirely independent of pipe diameter. Corrugation roots are fully supported without welding, so that only the concave part of the corrugation is exposed to pressure. An external cover protects corrugations from accidental damage.

For intermediate pressure service, where maximum flexibility is needed with a minimum number of corrugations, a modified HyPTor expansion joint is available. Corrugations are oval rather than circular, thus combining the high pressure stress-resistance of the true toroid with the low bending stress of the conventional U-shaped corrugation.

Zallea HyPTor expansion joints are usually made from stainless steel in 6-in. dia sizes and larger, for pressures up to 2000 psi. Expansion joints of other materials and for higher pressures are available on special order. Either flanged or welding connections can be furnished, as specified.

Control Valve

A new proportioning control valve, developed by High Pressure Equipment Co., Inc., 1222 Linden St., Erie, Pa., provides for greater accuracy by a longitudinal stem lift in line with the piston. When installed with line air pressure (up to 100 psi) it provides both accurate and safe automatic or remote control.

The deluxe metering valve with the removable orifice seat coupled with a Cono Control is manufactured for a range of pressure from 6,000 to 30,000 lb and sizes from 1/4" to 1/2". It can be specified to meet explosion proof requirements and is available in all types of material such as 316 stainless steel, Hastalloy and Monel Metal.



Steam Cleaners

A-13 Kelite Corporation, 81 Industrial Rd., Berkeley Heights, N. J. has introduced a new three-model series of direct-fired steam cleaners.

The Mark I, designed for light to medium duty, has an output of 120 gph. The Mark II, for medium to heavy duty, has a 200 gph output. The Mark III, with an output of 300 gph, is designed for maximum duty. The output of all three Kelite Steam Cleaners is rated at 320 F.



Each of the new cleaners provides a positive displacement piston pump capable of delivering its full rated output hundreds of feet from the machine; an efficient water-wall heat exchanger to provide maximum fuel economy; and a gas or oil burner which provides instant starting.

Standard equipment on all Kelite Steam Cleaners includes one heavy-duty steam cleaning gun with swivel-type rear grip and a forward grip aerated to provide cool operation; a Hy-Vel (high velocity) spray nozzle; and heavy duty hose.

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Welding Electrode

A-14 A new electrode, Super SteelTectic 110 having a deposited tensile strength of 110,000 psi, for arc welding on mild steels and high strength low alloyed steels is being introduced to local industry by Eutectic Welding Alloys Corporation, 446 Northside Drive, N.W., Atlanta 18, Georgia.

Super SteelTectic 110, a universal, all position ac-dc electrode was developed to fill the need for a high strength filler material required for parent metals such as carbon steels,

low alloy structural steels, castings, forgings.

This high tensile weld metal is particularly suitable for fillet welding of mild steel and results in overall savings, since it requires less joint preparation and less filler material.

For welding of I and H beams, machine supports and building conveyers where only one side is accessible, the electrode provides high strength "one side" welds.

Where joints are subject to heavy service loads, or require flush finished deposits such as pipeline fabrication, milling machine and lathe beds, Super SteelTectic 110 is outstanding because of its high strength.

Bridging features of Super SteelTectic 110 are especially suited for thick to thin application and poor fits in maintenance and emergency repair work. Slag is easily removed by light chipping.

The electrode is also recommended for build up of under cut shafts, sprocket teeth, housings and connecting rods which require a tough yet fully machinable overlay.

Super SteelTectic 110 is available in 3/32", 1/8", 5/32" and 3/16" diameter sizes.

Standby and Emergency Lights

A-15 Clean Sweep Co., 6534 Whittier Blvd., Los Angeles 22, Calif., is producing new hand-carry standby and shoulder-carry emergency lights for any location where power interruption could cause loss of control, accidents, etc.

The Model DA "Surelite" uses an 800 candlepower floodlight as standard which will furnish 3 hours of continuous light or 4 hours if used intermittently.

Surelite does not operate while a-c voltage continues but an interruption of line voltage automatically turns unit on to provide illumination during the power failure. Resumption of line voltage automatically disconnects the battery and the unit turns off. The sealed beam operates from the battery only and the battery is not recharged.

Model D is a portable lamp only, without the standby feature but with shoulder strap and 40,000 c.p. spot which furnishes 2 1/2 hours continuous or 3 1/2 hours intermittent light as standard. 800 c.p. flood and 40,000 c.p. spot lights are interchangeable in either model.

BROOK 150 HP, A.C. MOTOR powers the "CRUNCH" in SCRAP BALING PRESS



A Brook 150 HP, 875 RPM, Drip Proof, A.C. Motor is supplying steady, economical, dependable power for the 25,000 psi hydraulic unit of this scrap baling press . . . a 16" cylinder produces 2,500-ton ram pressure . . . an automobile is "crunched down" into a 2 cubic foot cake of steel.

Just the job for a Brook Motor, where continuous operation and low maintenance cost are important. In every industry . . . users have learned that "Brook is the motor you install and forget". All standard types . . . 1 to 600 HP. Popular models warehoused in major distributing centers. Dealers and service stations everywhere. Send for Catalog.

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DEOXY-SOL

SOLUTION OF HYDRAZINE

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Scavenger

for

Boiler Water

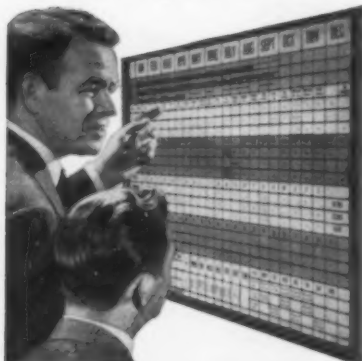
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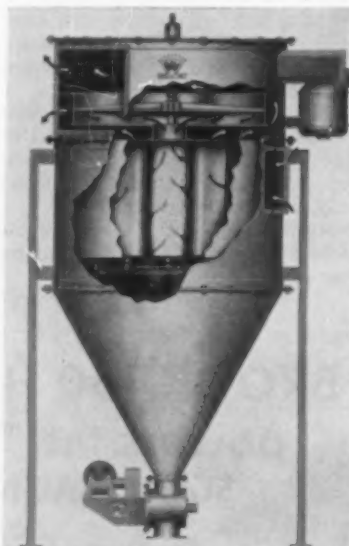
55 West 42nd Street • New York 36, N. Y.

New Product Briefs (Continued)

Dust Control Unit

A-16

A low cost dust filter unit which combines the features of a cyclonic dust separator and incorporates the high efficiency of a dust filter has been announced by **The Day Company**, 810 Third Ave., N. E., Minneapolis 13, Minn. The new design is a modification of the Day "RJ" dust filter. It provides efficiencies up to 99.99%.



The "RJ" employs the Hersey principal of high velocity reverse air cleaning but differs in that dust is deposited on the outside of the filter sleeves. An inner liner surrounds the filter sleeves and the dust laden air travels in a cyclonic path separating the heavy dust particles before the air carrying the "fines" enters the filter chamber. This unit has many applications. It is especially suited for separating the product from the airstream in pneumatic conveying systems.

This unit is designed for automatic continuous operation. No shut-down is necessary for rapping or cleaning. Product discharge is handled automatically and continuously by means of a Day rotary valve.

All moving parts of the filter are located on the clean air side. This assures long life for the mechanical assembly of the "RJ" filter. Engineering details are given in Bulletin 560.

Butterfly Valves

A-17

New rubber seated Darling-Pelton butterfly valves are being produced in sizes 4" to 72" for pressures in the 50-250 psi range by **Darling Valve & Manufacturing Company**, Williamsport, Pa.

Advantages claimed for the new rubber seated valves include: lower operating torque, adjustability of seat for tight shutoff, seat replacement without removal of shaft or operator, and elimination of shaft sealing problems (the rubber seat is a continuous ring integral with the disc).

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Epoxy Resin Cement In Self-Metering Tubes

A-18

A new aluminum-filled epoxy resin compound, recently developed by **Smooth-On Manufacturing Co.**, 527 Communipaw Ave., Jersey City 4, N. J., is being marketed in self-metering tubes to give additional convenience and economy in its numerous applications.



Metalset A4, a resin-catalyst system, comes packed in two collapsible tubes. The proper proportions of resin and low-toxicity catalyst are accurately measured automatically by squeezing out identical lengths of each material from its respective tube. The two different colored com-

ponents are then mixed to a uniform color.

Metalset A4 can be used as a smoothing and caulking compound, a patching material for metals, wood, plastics, and concrete, and a repair cement for leaking tanks, pipes, conduit, and windows.

Dual Torque Crane

A-19 Pacific Coast Engineering Company, Alameda, Calif.

has developed a new hoist control, applicable to both gantry and bridge cranes, that eliminates an auxiliary hoist. One hook provides speed with light load and power with heavy load. The hoist is called the Paceco "Dual Torque." This new hoisting concept lowers first costs, reduces maintenance costs, saves operating time and increases operating efficiency.

Advantages include dual capacity and speed with one set of hoisting and electrical equipment, constant torque and speed irrespective of load on any operating point, hoisting and lowering smoothly in increments of .005" to .010", and the Paceco mag-



netic amplifier with D.C. shunt motor field weakening.

While some cranes use a variable voltage system alone, Paceco applies the advantages of variable voltage and shunt field weakening to eliminate need for an auxiliary hoist and to attain high speed operating of the main hook under light and no-load conditions. In other systems, to get high, light-hook speeds, motors 4 times the size of Paceco Dual Torque motors are needed. Dual Torque combines the constant speed load characteristics of the shunt motor with a 4 to 1 speed range.

An illustrated bulleting describing Paceco Dual Torque is available on request to the manufacturer.

Vibration Detector

A-20

For protecting costly rotating equipment operating with more than normal vibration, the Instrument Division of the **Robertshaw - Fulton Controls Company**, 2920 N. Fourth St., Philadelphia 33, Pa., has developed a new monitoring device with a range of 0-4.5 G's.

The new model 65-LS (low sensitivity) malfunction detector is cased in an explosion-proof housing suitable for Class I, Group D; Class II, Groups F and G hazardous applications.

The device is available with single pole double throw switch, and a split contact normally open switch. Both are rated at 7 amperes, 460 volts a-c.

Applications include many types of engines, gear boxes, impact mills, centrifuges, and other rotating and reciprocating equipment with vibration levels above the 0-2G range of the model 65 detector.

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Southern News Briefs—Continued

COAL PREPARATION PLANT — VIRGINIA

The Garland Coal Co., with headquarters at 917 Hamilton Bank Bldg., Knoxville, Tenn., is now operating one of the most complete wet-washing and air cleaning and drying plants in the country.

This facility, the Coronet Jewell No. 2 plant near Whitewood, Buchanan County, Virginia, permits the separate cleaning and sizing of Coronet Jewell low volatile and Virginia by-product Splash Dam coals. Plant is served by the Norfolk & Western Railway and has six railroad tracks.

Coal is delivered to the crusher house either from the railroad tracks or through a truck dump. A belt conveyor takes the coal after it is crushed to five raw coal bins. Another belt conveyor takes the coal being prepared from the bins to the tippie. This is equipped with a Link-Belt Baum-type jig and Roberts & Schaefer Stump Air-Flow pneuma-

tic cleaners. Allis-Chalmers de-watering and sizing screens of the latest type are used.

The Coronet coal is shipped into the plant raw from the mine and shipped out the next day, after it has been prepared, in the same cars. It is expected the capacity of Coronet coal going through the plant will run up to 4,000 tons a day. On another shift the Splash Dam coal will be processed through the same plant and sent out the next day, again in the same cars. Probable maximum production of the Splash Dam coal will be about 3,500 tons daily.

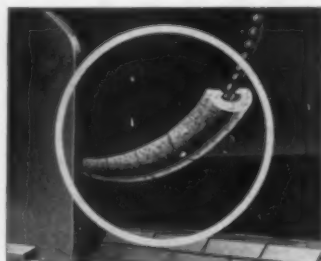
The facility, referred to as a prescription plant, has blending facilities so if a customer wants a mixture of Coronet Jewell and Splash Dam coals, Garland will be able to do that and make shipment of coal ranging between 21 and 29% volatile. Flexibility of the plant is illustrated by the fact that six grades of coal may be prepared simultaneously. Constant laboratory control insures an exact product of metallurgical coal.

pollution — the coveted Frank A. Chambers Award was given to Mr. Walter A. Schmidt, President of Western Precipitation Corporation. The award honors Mr. Schmidt "for his services in the control in air pollution through his many contributions to the art of electrical precipitation" and was a highlight of the national APCA meeting recently concluded in St. Louis, Missouri.

It was over a half-century ago that Mr. Schmidt, while studying engineering at the University of California, first became interested in a new electrostatic dust collection process being developed by Dr. Frederick G. Cottrell, an instructor at the University, and Mr. Schmidt subsequently was instrumental in making the first commercial installation of this newly-developed process. Today the Cottrell Electrical Precipitation process for controlling dust, fumes and fly ash is famous the world over.

Founded in 1907, Western Precipitation celebrates its Golden Anniversary this year. With district offices and subsidiary companies located in all major industrial areas of the United States and Canada, the corporation has continued to pioneer one important dust collection advancement after another, including introduction of the now widely-used small tube type of centrifugal collector (Multiclone), development of an advanced type of reverse-jet filter collector (Dualaire), as well as important advancements in the field of heat-processing equipment (Holo-Flite Processors and Hi-Turbiant Heaters).

One leak leads to another unless the seam is protected



If the seam of a riveted HRT boiler continues to be exposed to the same conditions, leaks are bound to recur. So the first leak is a warning against repeated leaking and caking.

The trouble and expense can be avoided by insulating the seam with a National Boiler Protector. This has been proved in thousands of cases over the last 40 years.

The relative costs of insulation and repair are suggested by the adage, "An ounce of prevention is worth a pound of cure."

Ask for our interesting literature.

NATIONAL BOILER PROTECTOR CO.
928 Reibold Bldg., Dayton 2, Ohio



Walter A. Schmidt (right) of Western Precipitation Corporation receives congratulations from Mayor Raymond R. Tucker (center) of St. Louis and C. W. Gruber (left), chairman of APCA Awards Committee, upon receiving the Chambers Award "for outstanding achievement in the control of air pollution."

Air Pollution Control Award for Western Precipitation

At the 1957 Annual Meeting of the Air Pollution Control Association — the nation's leading organization of engineers and scientists specializing in the abatement of air

A-C — Mid-Atlantic

Personnel changes in the Mid-Atlantic Region of Allis-Chalmers Industries Group have been announced as follows:

C. W. Parker, Jr., manager of the Richmond district since 1955, has been appointed manager of the Philadelphia district succeeding A. D. Brown, who has been transferred to the regional office staff.

J. M. Mathews has been named successor to Parker as manager of the Richmond district. He had been manager of the Charleston district since 1948.

Gordon Hood, a former sales representative in the Baltimore district, has been appointed manager of the Charleston district succeeding Mathews.

Texas Eastern — La.

Clark H. Craft has been named chief engineer and Ralph W. Howe has been named superintendent of measurement for Texas Eastern Transmission Corporation's Little Big Inch Division in Shreveport, La.

Mr. Craft will supervise all engineering and planning activities which concern the Little Big Inch Division while Mr. Howe will supervise measuring and gauging of all petroleum products handled by the division. The Little Big Inch Division handles pipeline transportation of petroleum products from the Gulf Coast to the Midwestern market areas.

Combustion Engineering

Martens H. Isenberg, president and director of Combustion Engineering, Inc., and associated with the company for 41 years, has resigned because of ill health. H. G. Ebdon, executive vice president, has been elected president and a director, and Arthur J. Santry, Jr., vice president and a director, vice chairman.

E. Keeler — South

E. Keeler Company has announced the appointment of Ralph S. Pruitt as district representative in North and South Carolina, Georgia, Tennessee and Florida.

Mr. Pruitt is headquartered in Anderson, S. C.

J. B. Ehrsam & Sons Continue Expansion

Hugh D. Kelley, former Production Manager of the J. B. Ehrsam & Sons Mfg. Co., has been named manager of the company's newly established Passenger and Freight Elevator Division in Enterprise, Kansas.

In addition to passenger and freight elevators and manlifts, the J. B. Ehrsam & Sons Mfg. Company manufactures complete grain elevators and feed mills, power transmission equipment, fertilizer manufacturing machinery and are custom founders with Micrometal Process Iron.

Southern regional sales offices are located in Atlanta, Denver and Kansas City, Kansas.

Wing — Southwest

L. J. Wing Mfg. Co., Division of Aero Supply Mfg. Co. Inc., Linden, N. J. announces the appointment of two sales representatives for the Wing line of revolving unit heaters, fans, blowers, draft inducers and steam turbines.

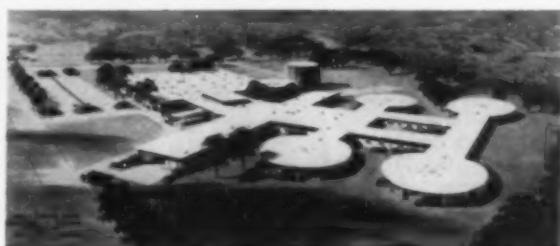
Stromquist & Company, 3158 Maple Drive, Atlanta, Ga., in all of Georgia except southwest portion.

Central Station Equipment Co., 2323 Aviation Highway, Tucson, Ariz., covering Arizona, New Mexico and El Paso County, Texas.

Trion — South

Trion, Inc. of McKees Rocks, Pa., manufacturers of electronic air cleaning equipment, has announced the appointment of additional representatives for their commercial and industrial units.

The new Trion representatives are: Air Filter Sales & Service Co., Inc., P. O. Box 2445, 449 Dory St., Jackson, Miss. and Devlin Brothers, 1003 Maritime Building, New Orleans 12, La.



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Service



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Write for complete information in Bulletin PF-1150, available free on request to the Industrial Capacitor Division, Sprague Electric Co., 49 Marshall St., North Adams, Mass.

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SPRAGUE

Jordan to Handle A-C Power Plant Equipment — Southeast

Appointment of **C. C. Jordan** as Southeast regional representative for



power plant equipment has been announced by **Allis-Chalmers Industries Group**. Jordan had been power plant equipment representative in the North Central region for Allis-Chalmers since 1954.

Jordan joined Allis-Chalmers in

1923. For a number of years he did field testing, field service work and sales estimating in the steam turbine department. In 1937 he became assistant manager of the department and in 1941 manager of the central station and marine sales department. Ten years later he was named assistant manager in charge of the mechanical sections of the power department. Jordan is a mechanical engineering graduate of Purdue University.

Territory embraced by Allis-Chalmers Southeast region includes district offices in Atlanta, Birmingham, Charlotte, Chattanooga, Knoxville, New Orleans and Tampa.

High Temperature Seal Div. for Robertshaw-Fulton

Robertshaw-Fulton Controls Company has announced the formation of a seal sales division to administer the sale of high temperature metallic

seals, developed by the company for use in aircraft, missiles, nuclear installations, and other industrial applications.

The new sales unit, with headquarters in the **Fulton Sylphon Division, Knoxville, Tenn.**, also will handle sales of long-established lines of metal bellows seals. These have been employed for years in the automotive, aircraft and chemical industries.

W. M. Watkins, Jr., former sales engineer specializing in automotive and aircraft seals, has been named sales manager of the new seal division. **George H. Giesler** will assist Mr. Watkins as applications engineer.

Fry-Holbrook — Carolinas

Hugh H. Cochrane of Charlotte, N. C. has joined **Fry-Holbrook & Co.**, manufacturers agents.

Classified Advertisement

FOR SALE

TWO Titusville Type A-4-26, 3 drum bent tube, water tube boilers, 6,109 sq. ft. heating surface, 200 psig design pressure, manufactured in 1952, complete with standard trim and supporting steel, not presently equipped with superheaters but designed for superheater installation. Recommended continuous operation load 200%. Manufacturers' Data Report and Certified Prints are available for inspection. Boilers are not now in use and may be inspected by appointment.

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Diboll, Texas

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Mr. Cochrane will handle the company's rapidly expanding activities in **North and South Carolina** with headquarters at Charlotte.

The firm represents a number of general hardware manufacturers and maintains its general offices at 1492 Peachtree St., N.E., Atlanta 9, Ga.

B & W Refractories — Ga.

The Augusta, Georgia District Sales office of **The Babcock & Wilcox Company's Refractories Division** has been moved from the company's Augusta Works in South Augusta, to Room 408 of the News Building, 725 Broad St., Augusta.

\$

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Your used transformers are worth money! Send us a description and we'll tell you what they're worth! We build transformers and coils to your specifications. Send us your blueprints for prompt quotation.

TRANSFORMERS BOUGHT, SOLD, REPAIRED and RENTED
45 Years of Dependable Service

THE ELECTRIC SERVICE CO.

5323 Hetzel St., Cincinnati 27, Ohio

Personnel Changes at Texas Gas Transmission

W. S. Godwin, manager of Texas Gas Transmission Corporation's Clarksdale, Miss. compressor station the last seven years, has been appointed superintendent of the Tennessee-Mississippi division of the company's compressor department.

In his new position Godwin will have supervision over Texas Gas compressor stations at Kenton and Covington, Tenn., Lake Cormorant, Lula, Clarksdale, Benoit and Greenville, Miss.

Godwin, who will be located at Texas Gas division offices at Memphis, Tenn., succeeds T. L. McWilliams as division superintendent. McWilliams was recently made assistant superintendent of the entire Texas Gas compressor department.

T. C. Tatum, manager since March 25, 1945 of the Texas Gas compressor station at Lula, Miss., succeeds Godwin as manager of the Clarksdale station, and J. C. Stewart succeeds Tatum as manager at Lula. Stewart has been assistant manager at Texas Gas' Greenville, Miss., compressor station the last several years.



Goggles — High Fashion With Dye and Glitter

High fashion has come to common safety goggles in a fast-spreading way at the Texas City plant of Union Carbide Chemicals Company, Division of Union Carbide Corporation. Enterprising employees hit on a way to dress up their "specs."

The new look is achieved by dunking the glasses in a jar of

warm dye and allowing them to soak for about 30 minutes. Once the dye, which doesn't affect the lenses, has penetrated the porous plastic frames, they're taken out, rinsed under a faucet, and allowed to dry. In place of the nondescript pair of spectacles that went in, you've got an attractive, brightly colored set of safety goggles.

Some of the women at Carbide carry fashion one step further. For a few cents they pick up a package of gold or silver glitter and glue it on the brightly colored frames.

A check with the Plant Safety Division turned up no objections to the stylishly hued frames. "As a matter of fact it's created new interest and enthusiasm in eye protection," said one official — as he polished his new crimson-hued frames.

Iron Fireman

Lewis J. Cox, executive vice president of the Iron Fireman Manufacturing Company of Cleveland, Ohio, has been elected president of the company.



Water storage tank for the city of Atlanta, Georgia. This 500,000 gallon tank was fabricated by the J. J. FINNIGAN Company, Inc. from raw material to final erection. 34' diameter, 75' high.

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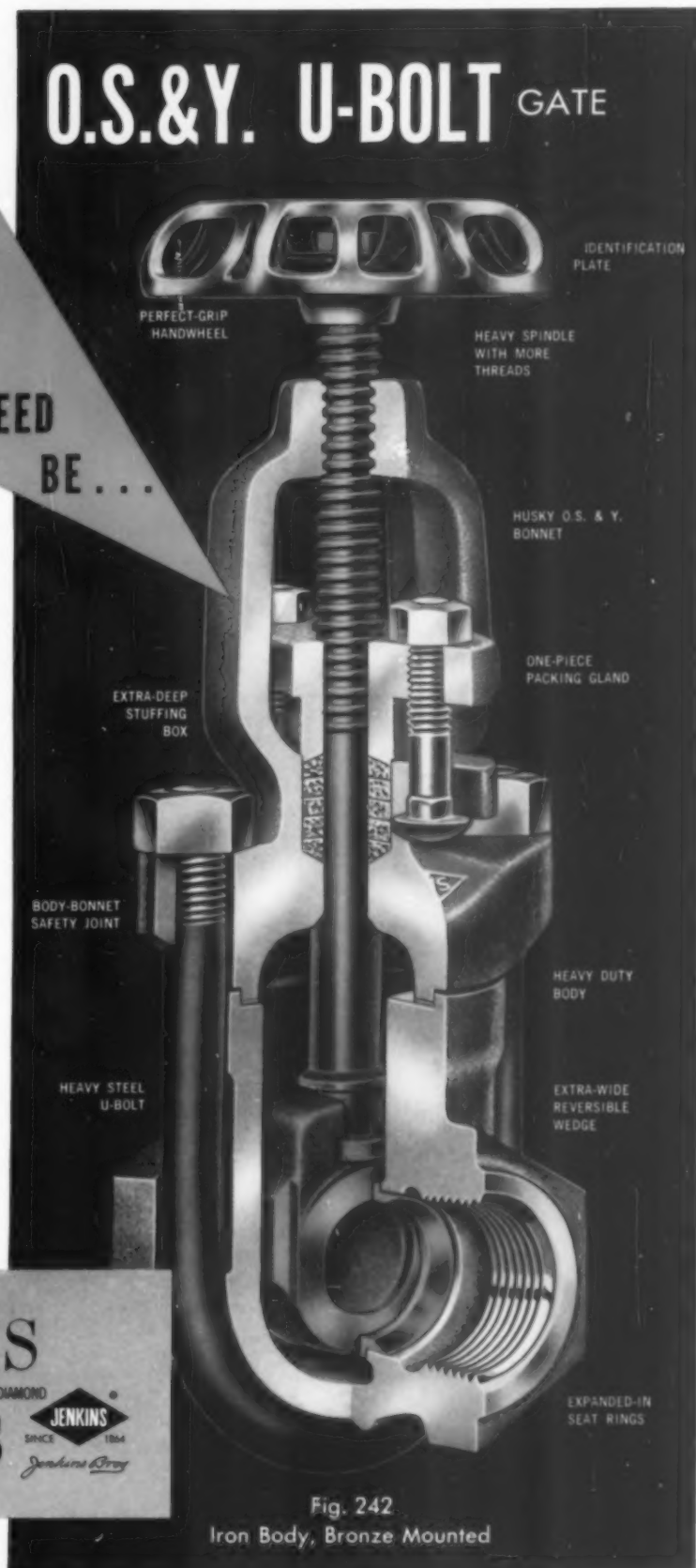
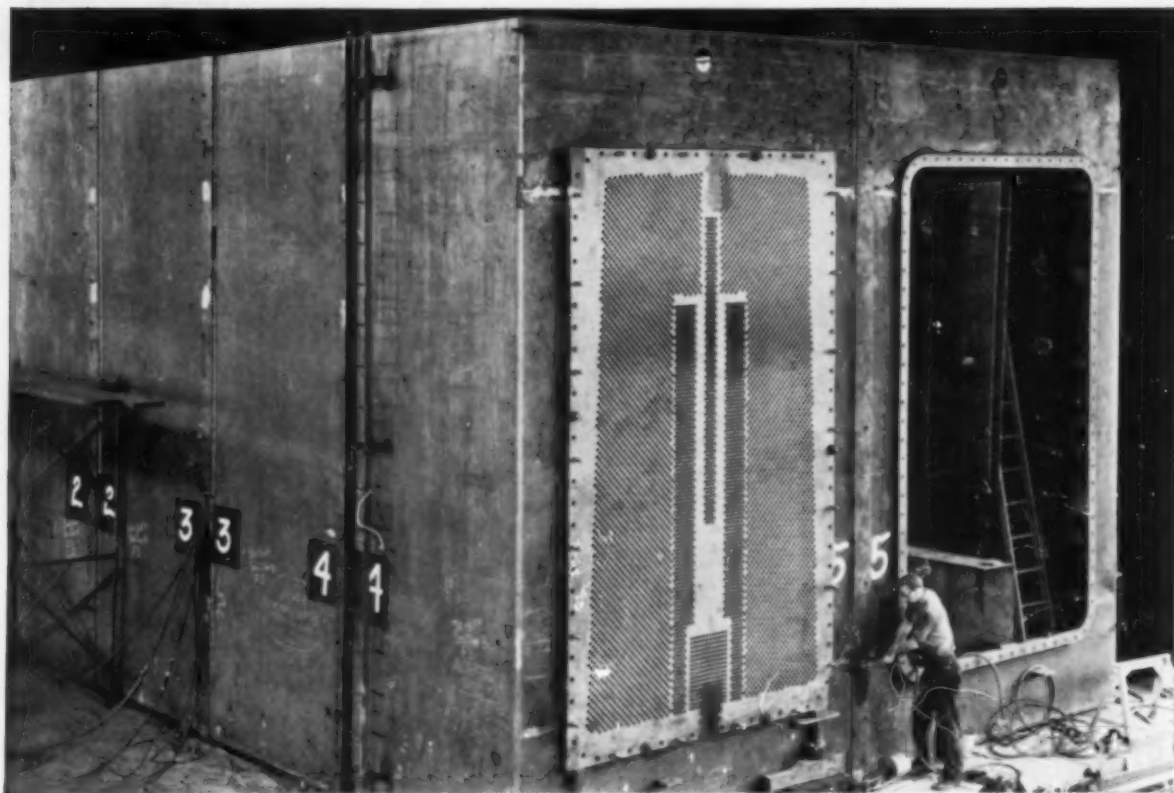


Fig. 242
Iron Body, Bronze Mounted



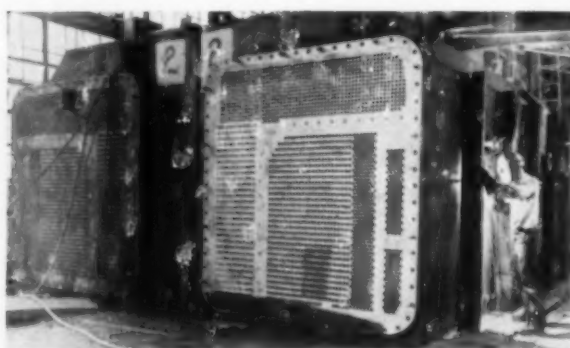
HERE'S ONE SHELL of this twin-shell, triple-lane unit just before shipment to Consolidated Edison's Astoria Station. It's designed to condense 1,600,000 lbs. steam/hr. at 1.87" Hg., with 244,000 gpm circulating water, and has 27,450 aluminum-brass tubes. Unit serves 335,000 kw turbine.

HUGE, SINGLE-PASS, 187,000 sq. ft. CONDENSER

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VICE-PRESIDENTS LEE YETTER and Roy Driescher, and Chief Engineer Paul Hamm are responsible for the design and construction of all Wheeler condensers. They work with engineers employed by C. H. Wheeler's customers, with turbine manufacturers' engineers and consulting engineers in BTU chasing.



TYPICAL REVERSE FLOW CONDENSER is this 35,000 sq. ft. unit for a Southern electric utility. Patented Reverse Flow feature permits flushing debris from tubes with only slight (and momentary) vacuum loss. Note low height to save head room, rectangular cross section to further utilize space for this Wheeler client.

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